



E-Futures



The University Of Sheffield.

Poster presented at CIE conference 'Towards a new century of light', Paris, 15-16 April 2013

1. Background

Design criteria for residential street lighting in the UK (see Table 1) are not currently based on robust, empirical evidence (Fotios & Goodman, 2012).

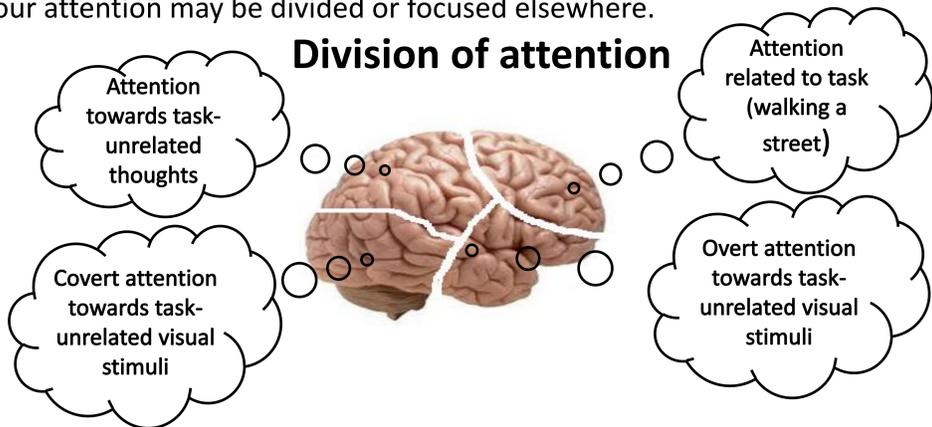


Research is underway to better understand street lighting requirements from a human vision perspective. One aspect of this involves understanding where people look when walking a street at night, and what the important visual tasks are performed by pedestrians.

2. Visual attention

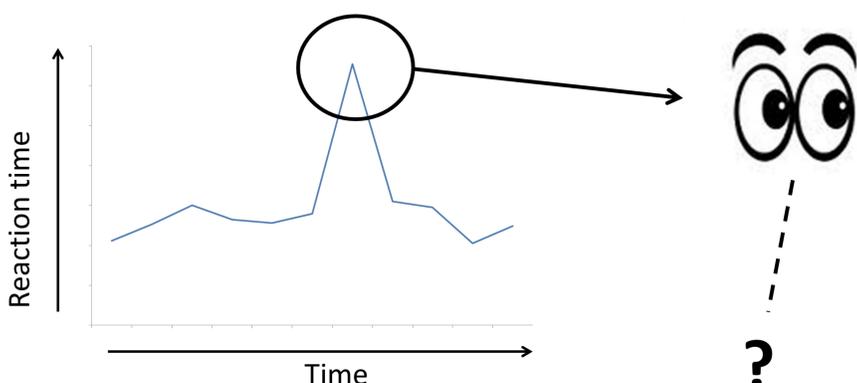
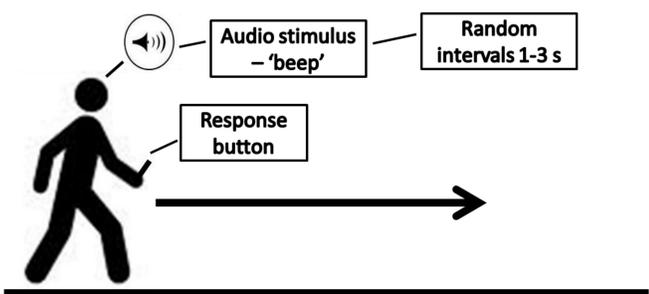
Eye tracking can be used to determine what people look at during a task such as walking down a street (e.g. Davoudian & Raynham, 2012). However, our gaze behaviour may not always reflect what is significant as our attention may be divided or focused elsewhere.

Division of attention



3. Dual task

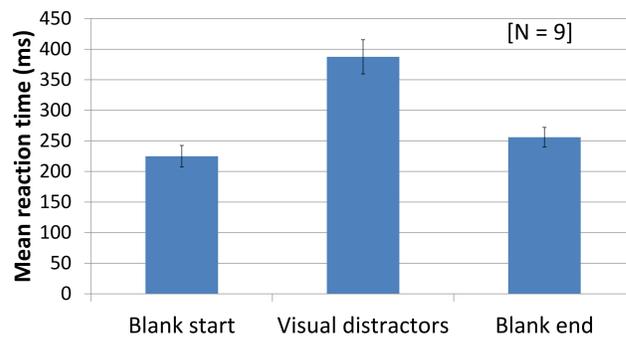
Eye tracking and concurrent cognitive task can highlight important visual behaviour. Reductions in task performance may indicate redirection of attention to something visually significant or distracting. Reaction time to audio stimulus shown to be suitable concurrent task (see box 4).



Critical pedestrian tasks: Using eye tracking within a dual-task paradigm

Steve Fotios, Jim Uttley, Naoya Hara
j.uttley@sheffield.ac.uk

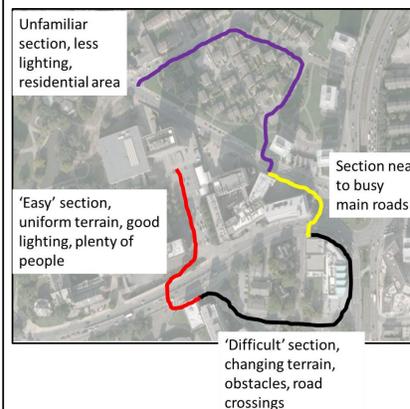
4. Pilot study results



Reaction times were significantly longer when visually distracting images presented to participants on computer screen, compared with when screen was blank.

5. Procedure

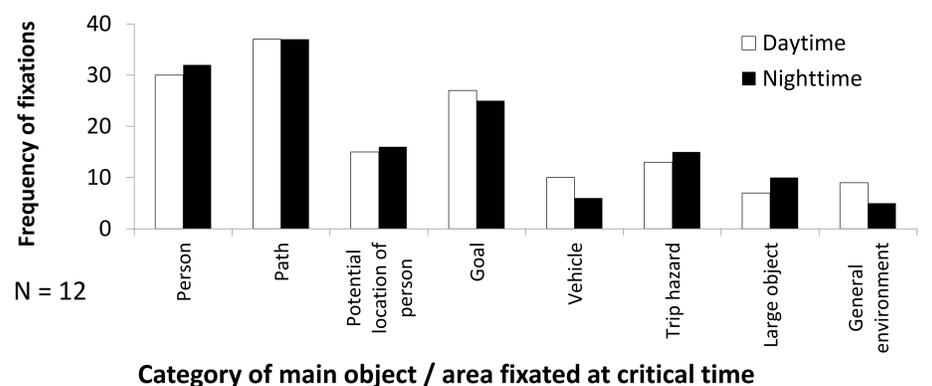
Participants asked to walk short (10 minute) route whilst wearing eye-tracking equipment and carrying out reaction time task (button press in response to audio stimulus every 1-3 s):



- Route = 900m
- Four sections
- N = 40
- Daytime and after-dark sessions
- Route reversed for second session
- Participants interviewed after second session

6. Analysis

Initial analysis focused on identifying objects and areas fixated at critical times (when reaction time to audio stimulus is 2 standard deviations above participant's mean).



Further analysis will include:

- Categorising fixations at non-critical times
- Spatial mapping of critical time locations
- Participant walking speeds

7. Conclusion

Results from the pilot study and initial results from the main study suggest a dual-task paradigm involving a reaction-time task can identify significant gaze behaviour and visual distractions. This method will help us better understand what the crucial visual tasks performed by pedestrians are on residential streets at night.

References

- Fotios, S., Goodman, T. (2012). Proposed UK guidance for lighting in residential roads. *Lighting Research and Technology*, 44, 69-83.
 Davoudian, N., Raynham, P. (2012). What do pedestrians look at at night? *Lighting Research and Technology*, 44, 438-448.