

Contribution of Physiological Limitations of Vision to Change Blindness

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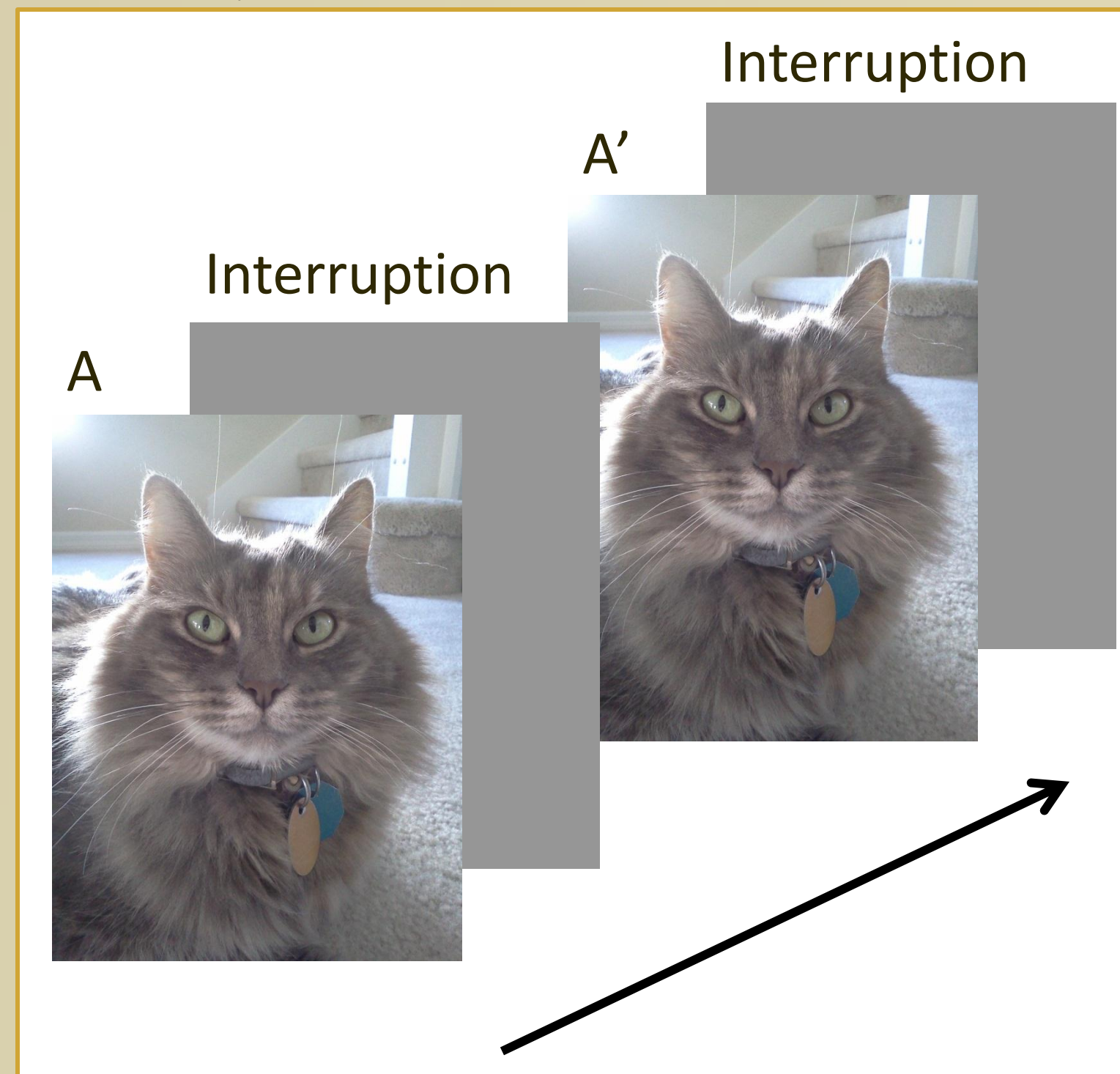
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Previous Research

Change Blindness is the failure to detect changes to a scene or object (Simons & Levin 1997).
Often caused by lack of attention (Rensink 2000).

Results using flicker paradigm suggest it takes a long time to detect changes

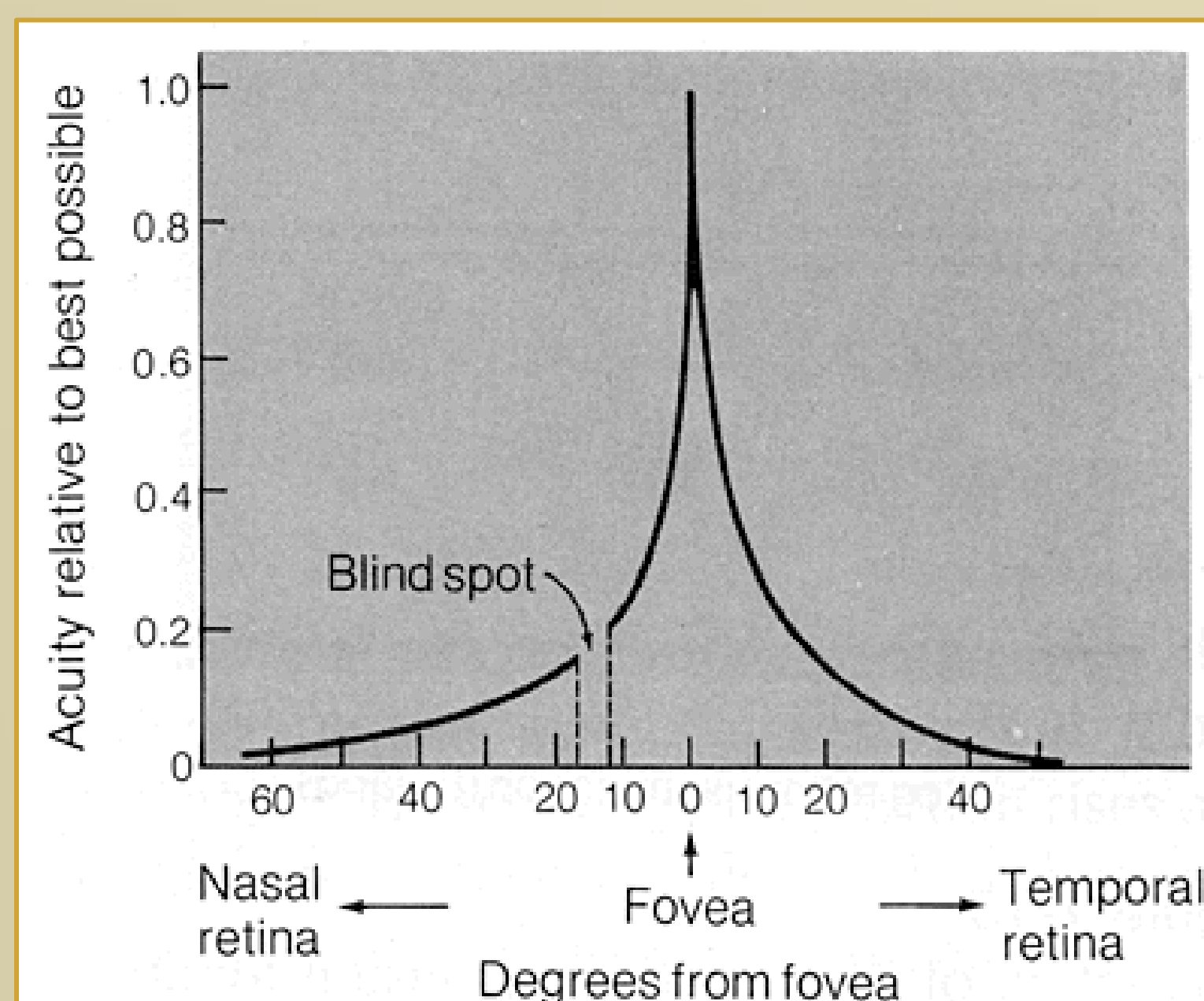
(Rensink, O'Regan, & Clark 1997).



When cued to look where a change may be, participants detected changes with near perfect accuracy (Wilson & Goddard 2011).

Limitations of Vision

Visual acuity is greatest at the fovea. Fovea has a diameter of only 2° (Foley & Matlin 2010).

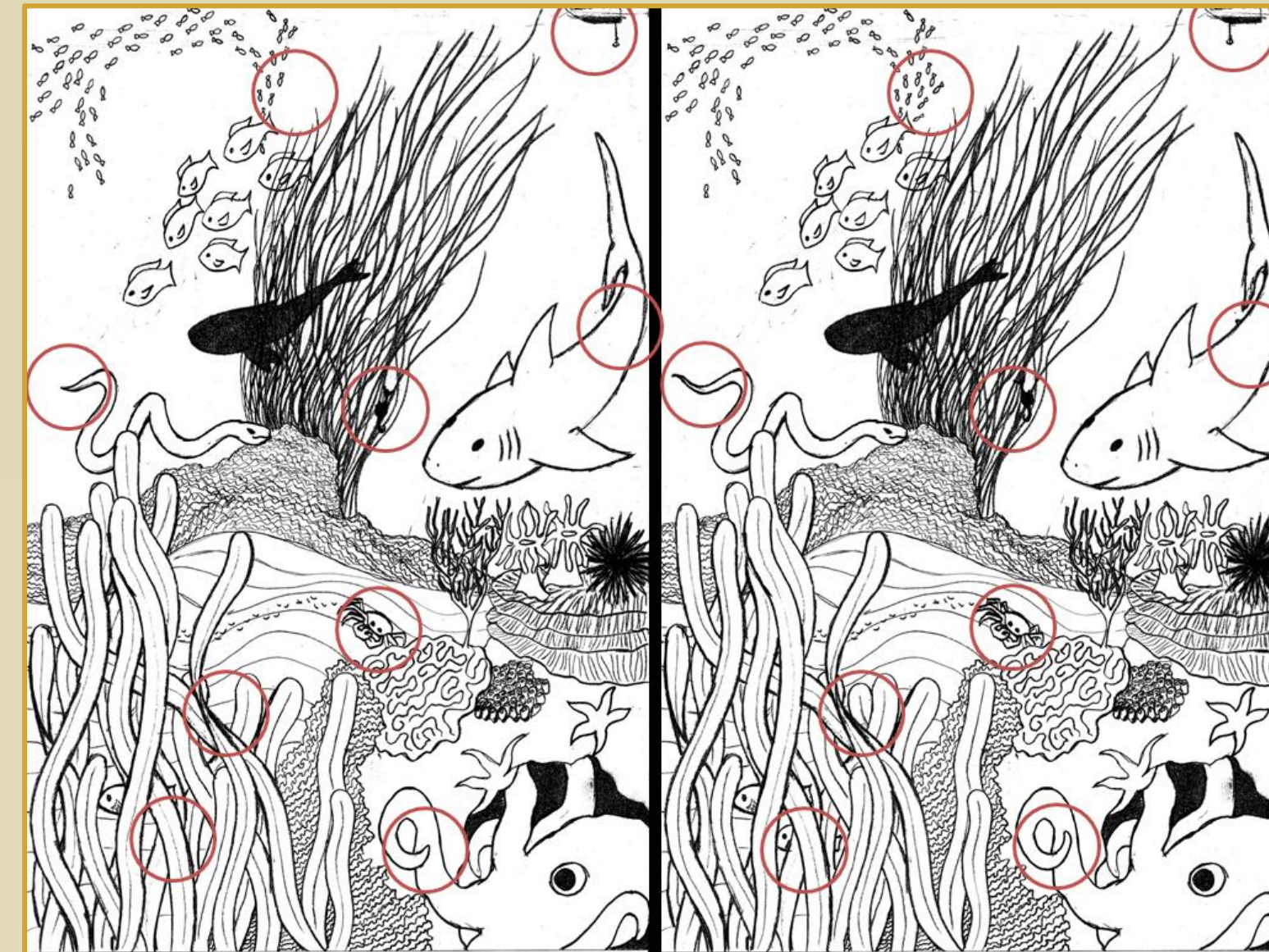


Research Question

Do the limitations of vision contribute to Change Blindness?

Methods

Participants (N=12, mean age 19.6) located differences between two drawings.

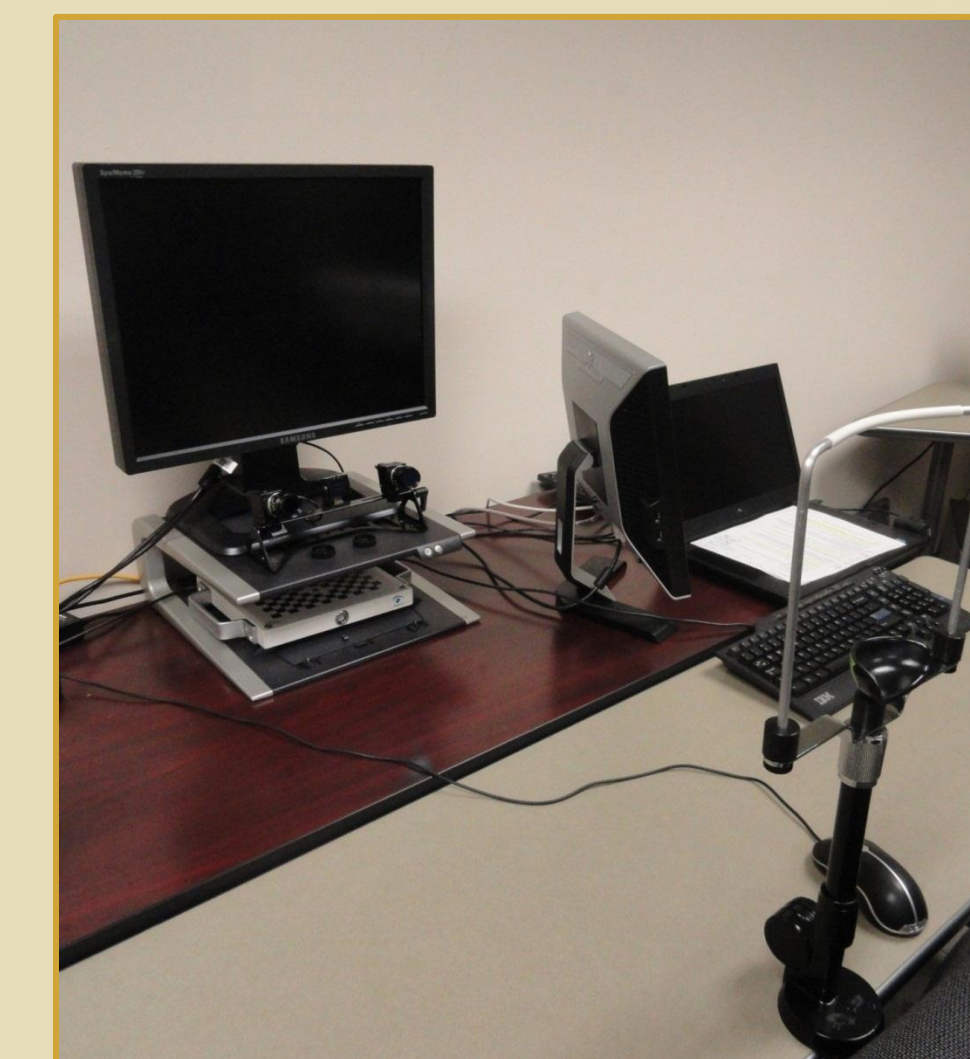


Group 1 viewed drawings for 3 minutes, and Group 2 viewed the drawings for 1.5 minutes. We hypothesized that longer time would result in more changes found for fixations which were not equipment errors.

A faceLAB 5.0 eye tracking system was used to record the location of participants' fixations.

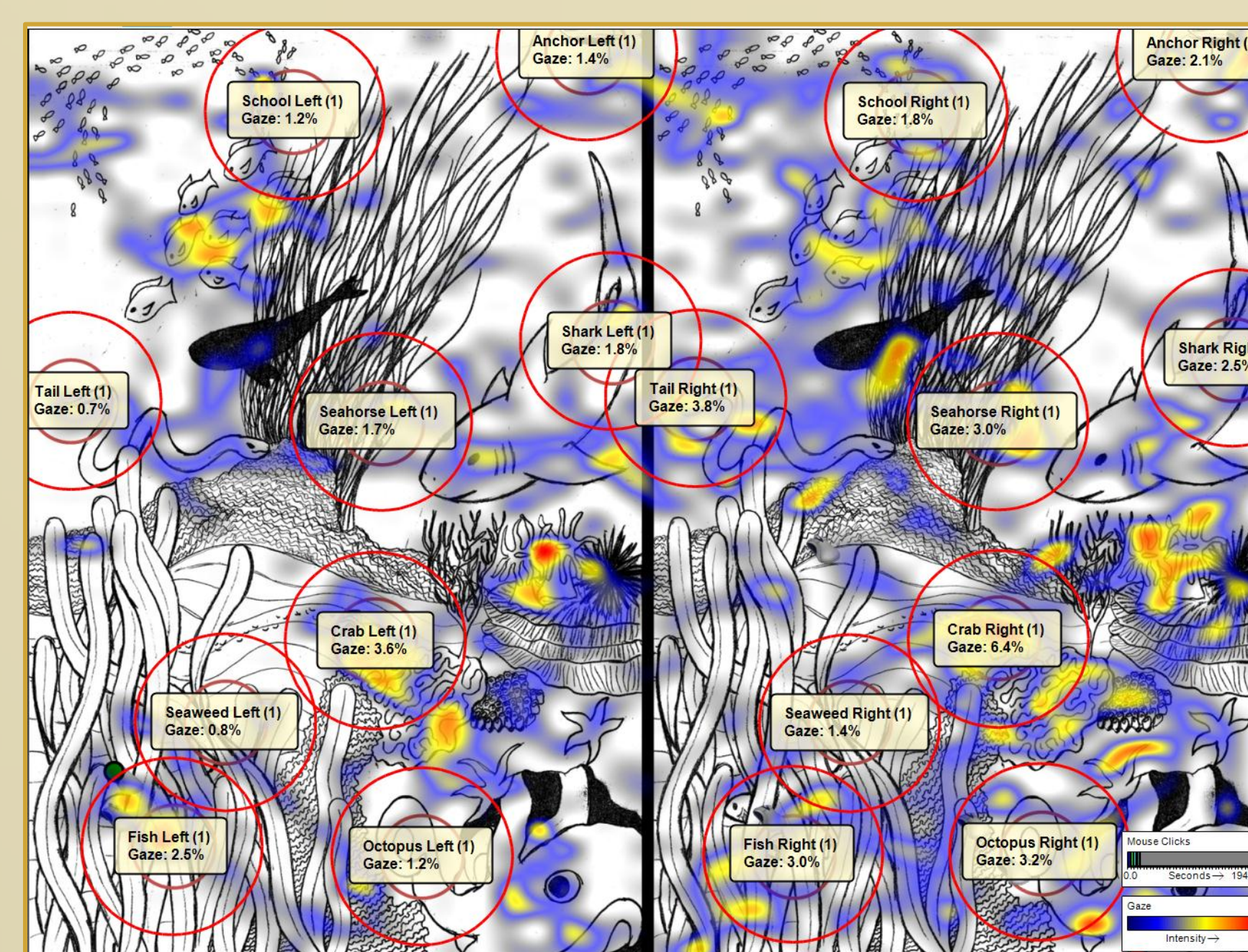


A chinrest was used to prevent head movement.



Analysis

To determine if a participant fixated on a change, a region with a radius of 2° was constructed around each change.



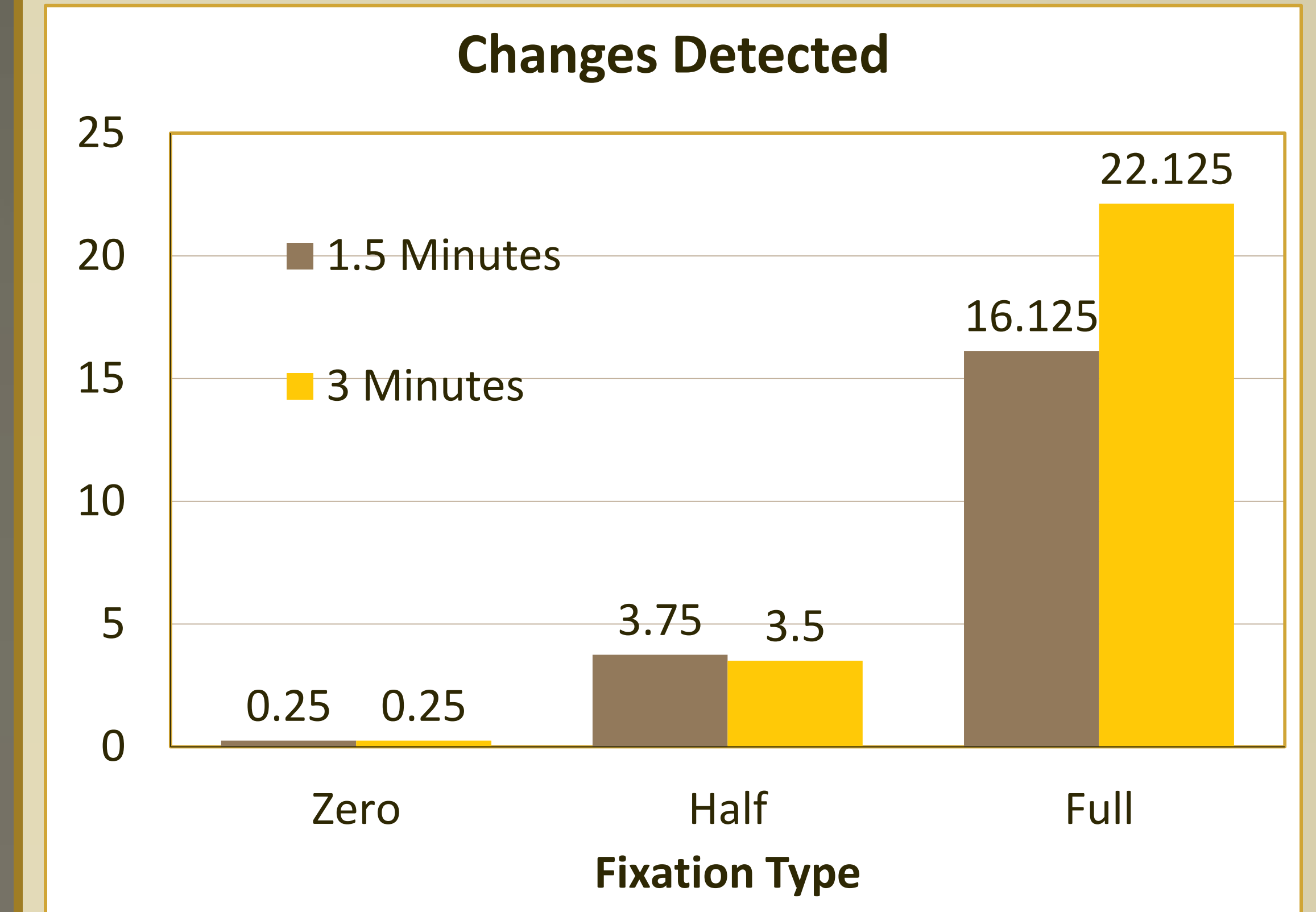
A change was considered "detected" if the participant clicked on the change.

Detected changes were classified as "Full," "Half," or "Zero" based on whether the participant fixated on the location of a change in both images, one image, or neither image.

	Change in Image 1	Change in Image 2
Full	✓	✓
Half	✓	✗
Zero	✗	✗

Results

We performed a one-way MANOVA. There was a significant difference between the 1.5 and 3 minute conditions [$F(2,12) = 4.31$, $p = 0.28$; Wilks' Lambda = .48; Partial eta squared .519].



Using a Bonferroni adjusted alpha of .025 results for fixation type were considered separately. Full Fixation showed a significant difference [$F(1, 14) = 12.94$, $p = .003$; partial eta squared = .48].

Discussion

In the vast majority of cases, changes were detected with a Full fixation. This suggests that there is a physiological prerequisite to change detection, and that change blindness is not only attentional.

Changes detected with a Half or Zero Fixation may be due to equipment error.

References

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