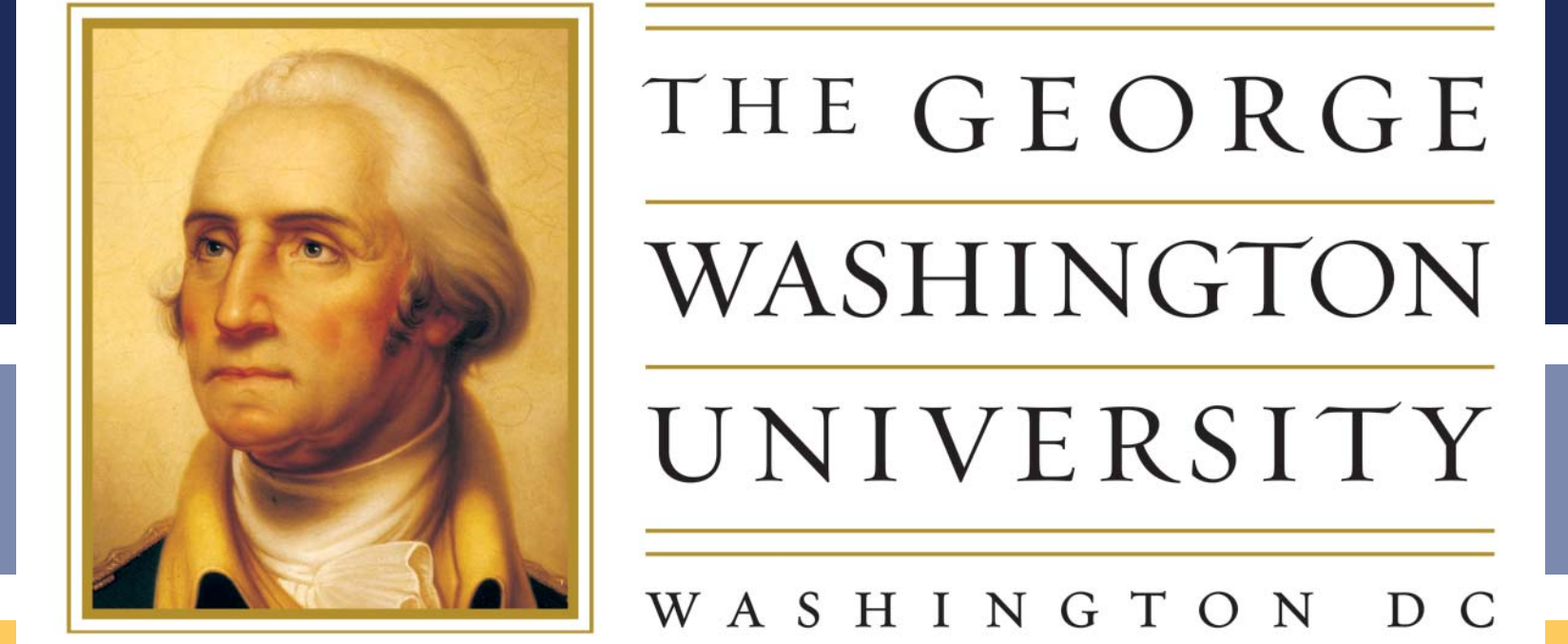


Exploring the Time Course of Egocentric Distance Perception with Visual Masking of a Real-World Environment

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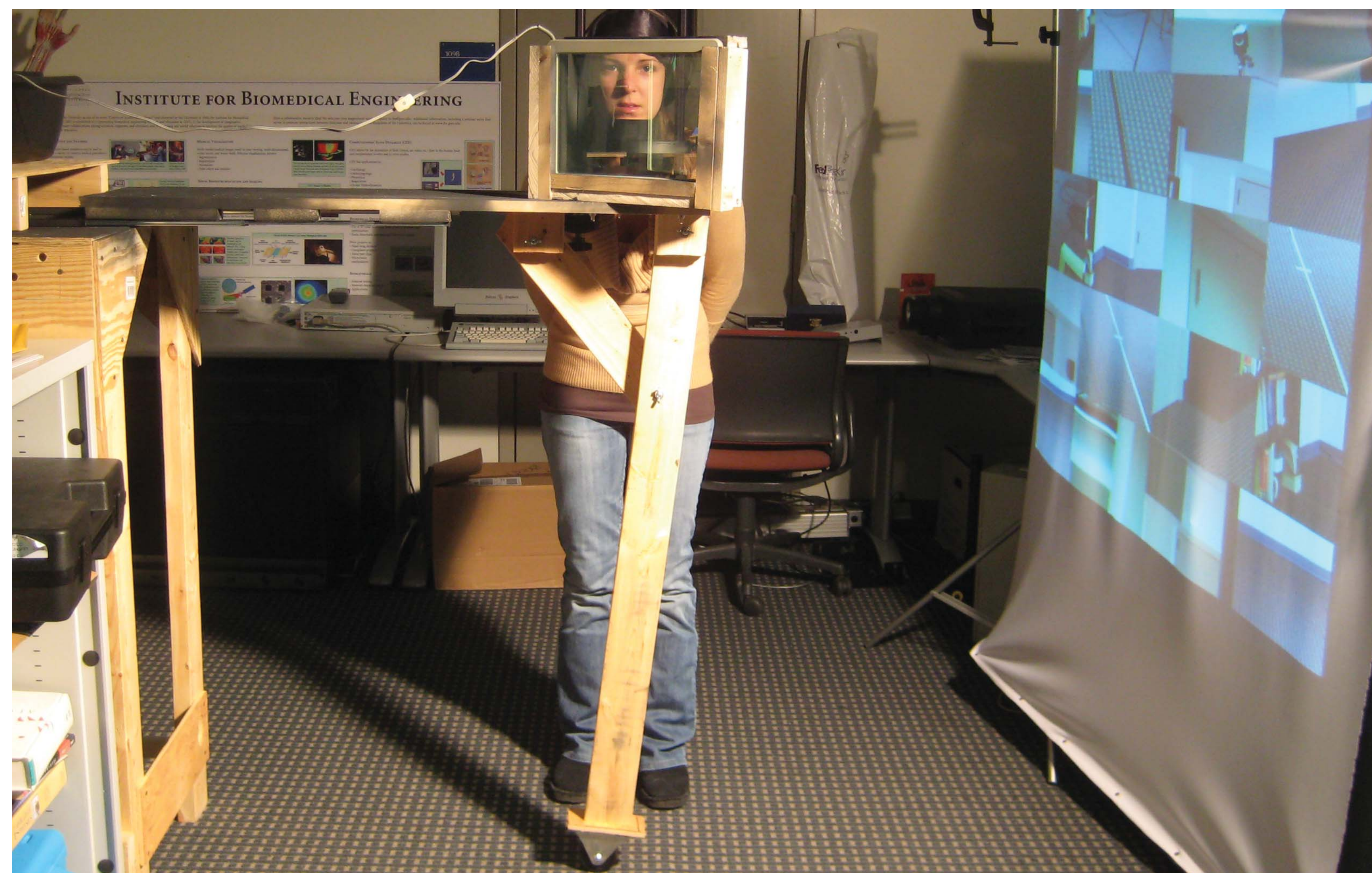
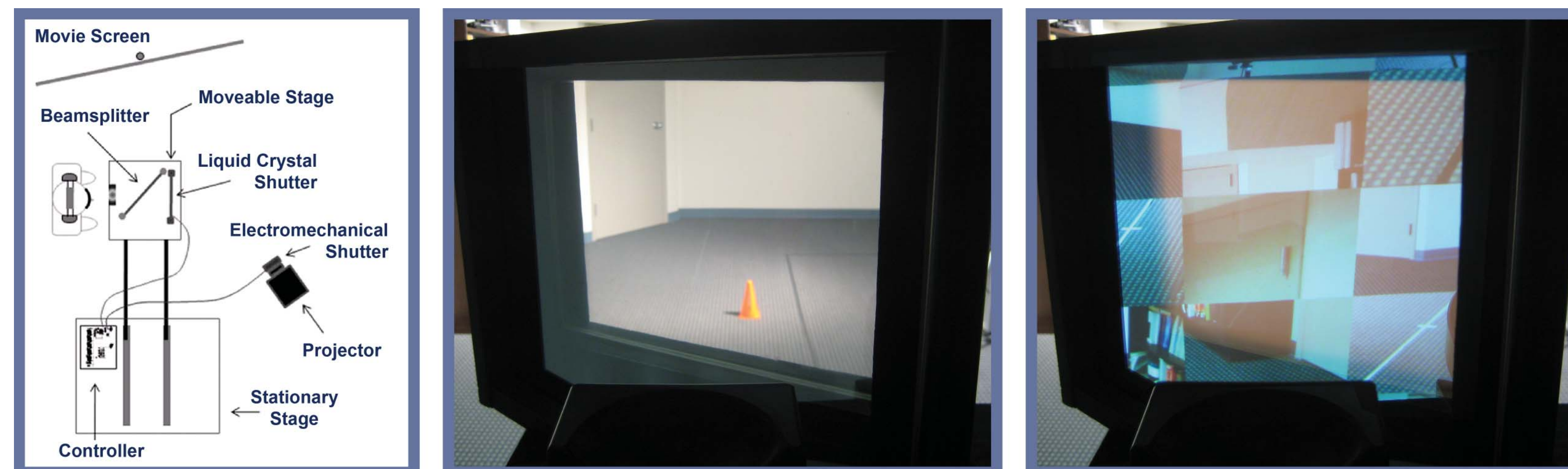
Background

Humans are able to walk without vision to previewed targets with equal accuracy under brief (150 ms) and extended (>5 sec) viewing conditions (Philbeck, 2000), suggesting that the extraction of egocentric distance information is quick.

Here we developed a method for masked, tachistoscopic presentation of real-world environments and began investigating the time course for accurate distance perception in full and reduced cue contexts using the blindwalking paradigm.

General Method

- Target viewing time controlled with liquid crystal shutter window
- Masking stimulus reflected into beamsplitter for 1 sec (ISI = 0)
- Apparatus pushed to the side after presentation of the mask
- Participants walked without vision to remembered location of target



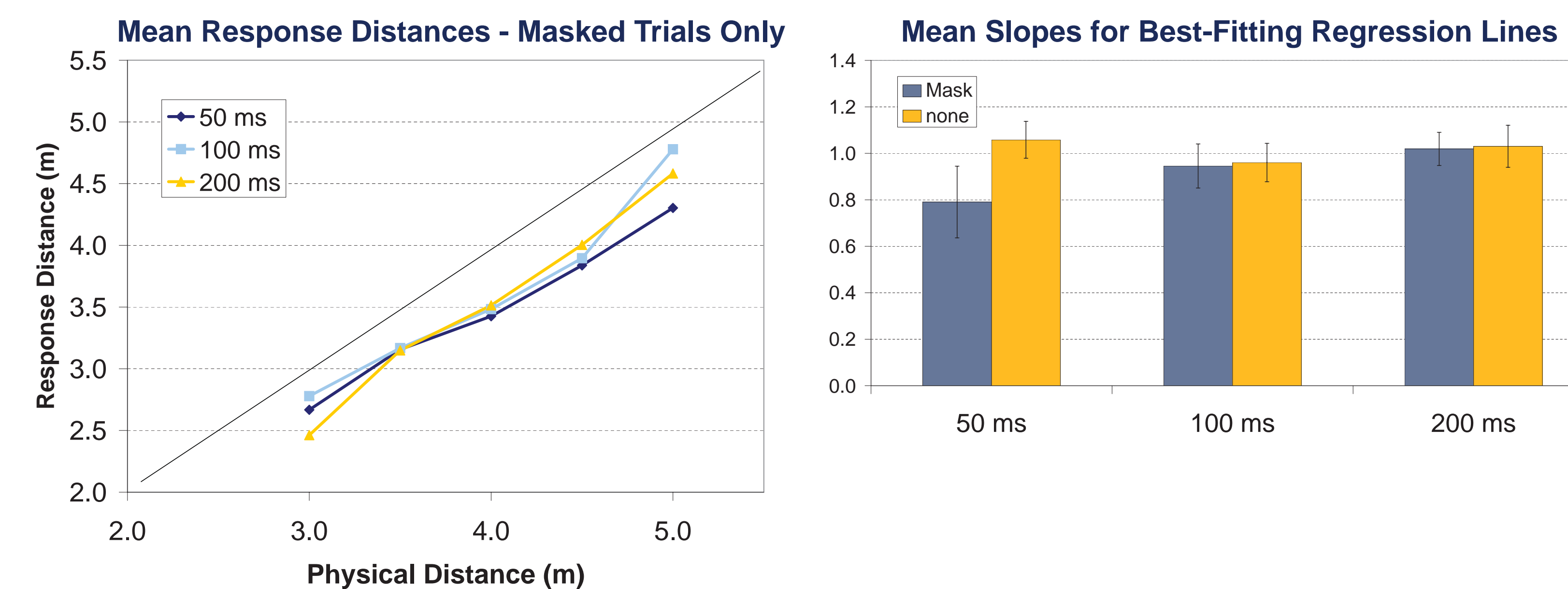
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Experiment 1: Full-Cue Context

- Participants binocularly viewed an orange cone placed on the floor
- 3 Viewing Durations (50, 100, & 200 ms)
- 2 Mask Conditions (Pattern Mask or None)
- 5 Distances (3.0, 3.5, 4.0, 4.5, & 5.0 m)

Results & Discussion

- Effect of distance (response slopes) did not depend on viewing duration or the presence of a mask
- Planned analyses revealed a marginal mask effect at 50 ms only - the effect of distance was greater without the mask (increased slope)



Blindwalking performance was accurate at 100 ms and only slightly depreciated at 50 ms with a mask. This outcome suggests that useful information is extracted even in the fastest manipulated time frame. Future experiments will determine the minimum viewing duration required. Experiment 2 determined the time required to extract useful information in a reduced-cue context.

Exp 2: Reduced-Cue Context

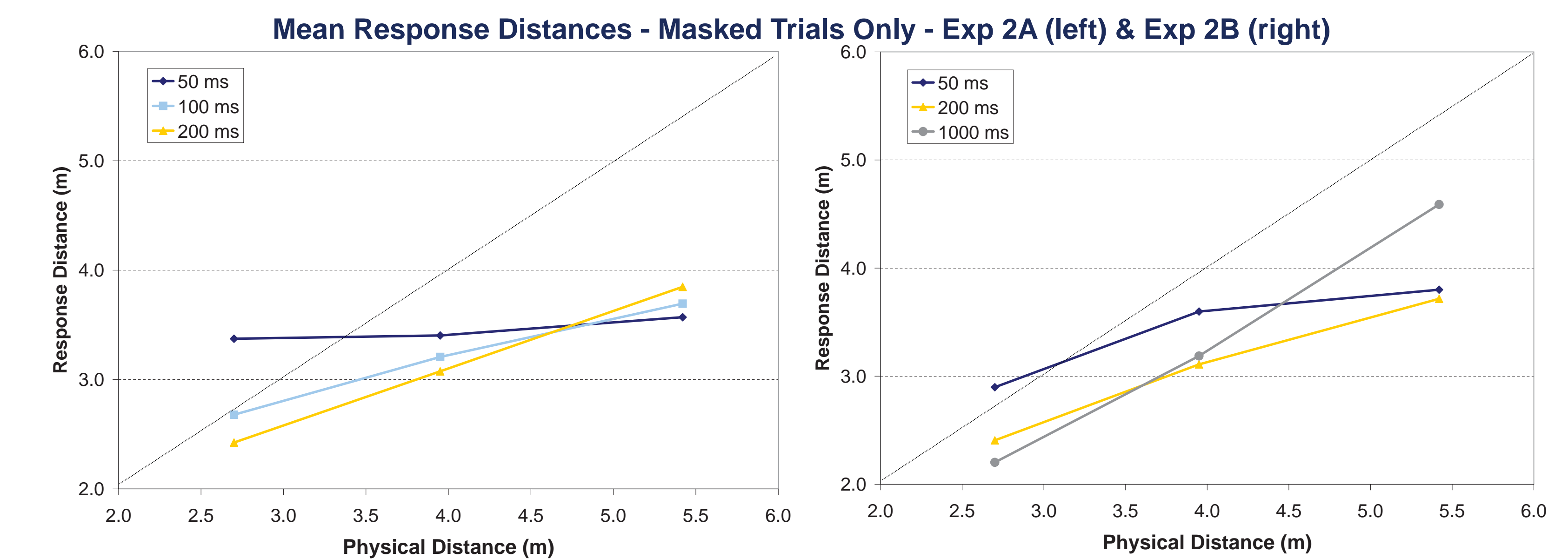
Participants binocularly viewed ball targets hung at eye level. Ball size varied with distance - angular size and decination were both held constant.

- 2 Subexperiments
- 3 Viewing durations each
 - Exp 2A: 50, 100, & 200 ms
 - Exp 2B: 50, 200, & 1000 ms
- 2 Mask Conditions (Pattern Mask or None)
- 3 Distances (2.70, 3.95, & 5.42 m)

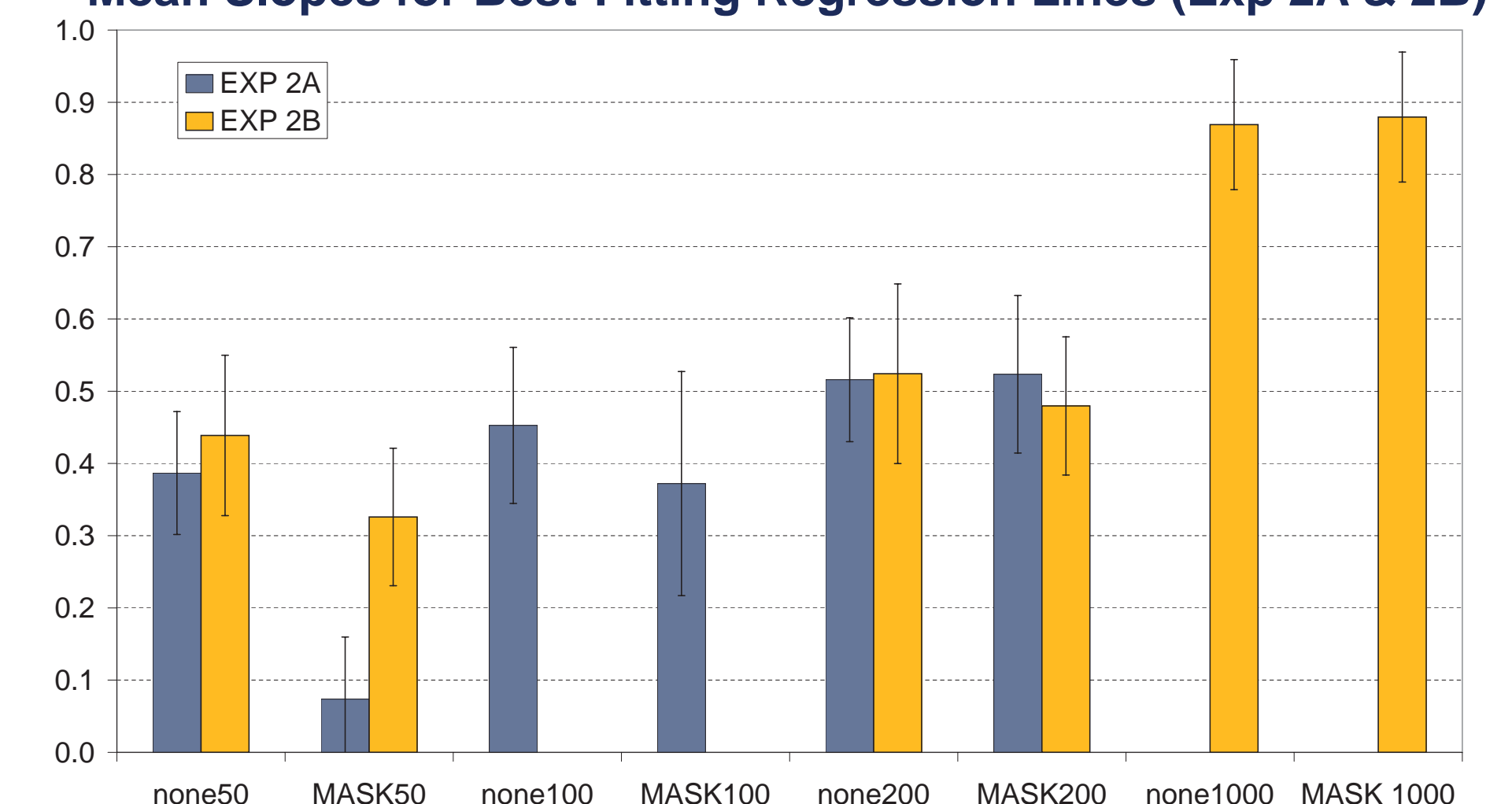


Results & Discussion

- Response slopes increased with viewing duration in both experiments
- Mean responses greater with mask (3.3 m) than without (2.9 m) in Exp 2A
- No effect of distance at 50 ms with a mask in Exp 2A
- Response slopes greater at 1000 ms than 200 ms in Exp 2B



Mean Slopes for Best-Fitting Regression Lines (Exp 2A & 2B)



The mask effect was more compelling in the reduced cue context. Participants showed no distance sensitivity in the 50 ms masked condition and performance continued to improve with extended (1000 ms) viewing. Performance at the shortest viewing duration was better in the context of 1000-ms trials, suggesting the extraction of information benefited from experience acquired during the extended-viewing trials.

Conclusion

The outcome of the study demonstrates 1) the utility of masking real-world scenes, 2) the efficiency of information extraction in the full-cue context, 3) that information extraction can unfold over extended time periods when the cues are reduced, and 4) that information extraction can be speeded by previous experience.

Reference

Philbeck, J. W. (2000). Visually directed walking to briefly glimpsed targets is not biased toward fixation location. *Perception*, 29, 259-272.