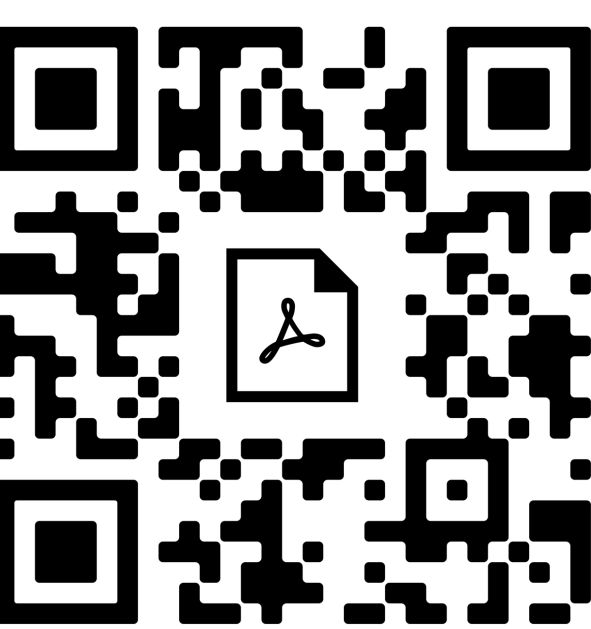




# Do stimulus regularities help protect visual perception from peri-saccadic impairment?

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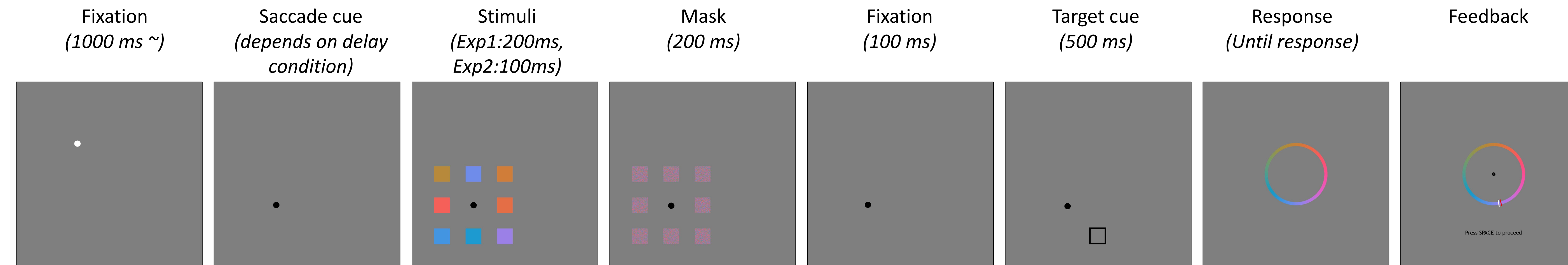
## Introduction

- 1) Every time we make saccadic eye movement, visual inputs drastically change.
- 2) Visual perception around the time of saccade (peri-saccadic perception) is impaired/distorted<sup>1,2</sup>.
- 3) Real-life visual environments inherit regularity, which remains relatively constant within a scene.
- 4) Does global stimulus regularity influence visual perception around the time of saccadic eye movement?

In the current study, we investigated (1) impaired peri-saccadic perception and (2) whether the influence of global stimulus regularity changes peri-saccadically.

## General design

“Report the color of post-cued square”



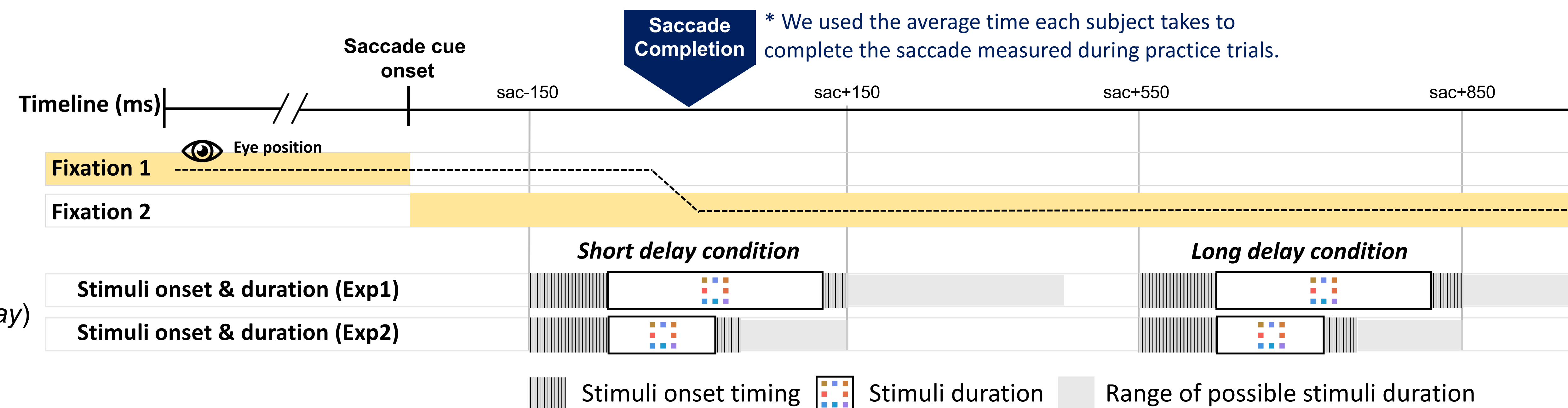
### Conditions

#### 1) Saccade condition

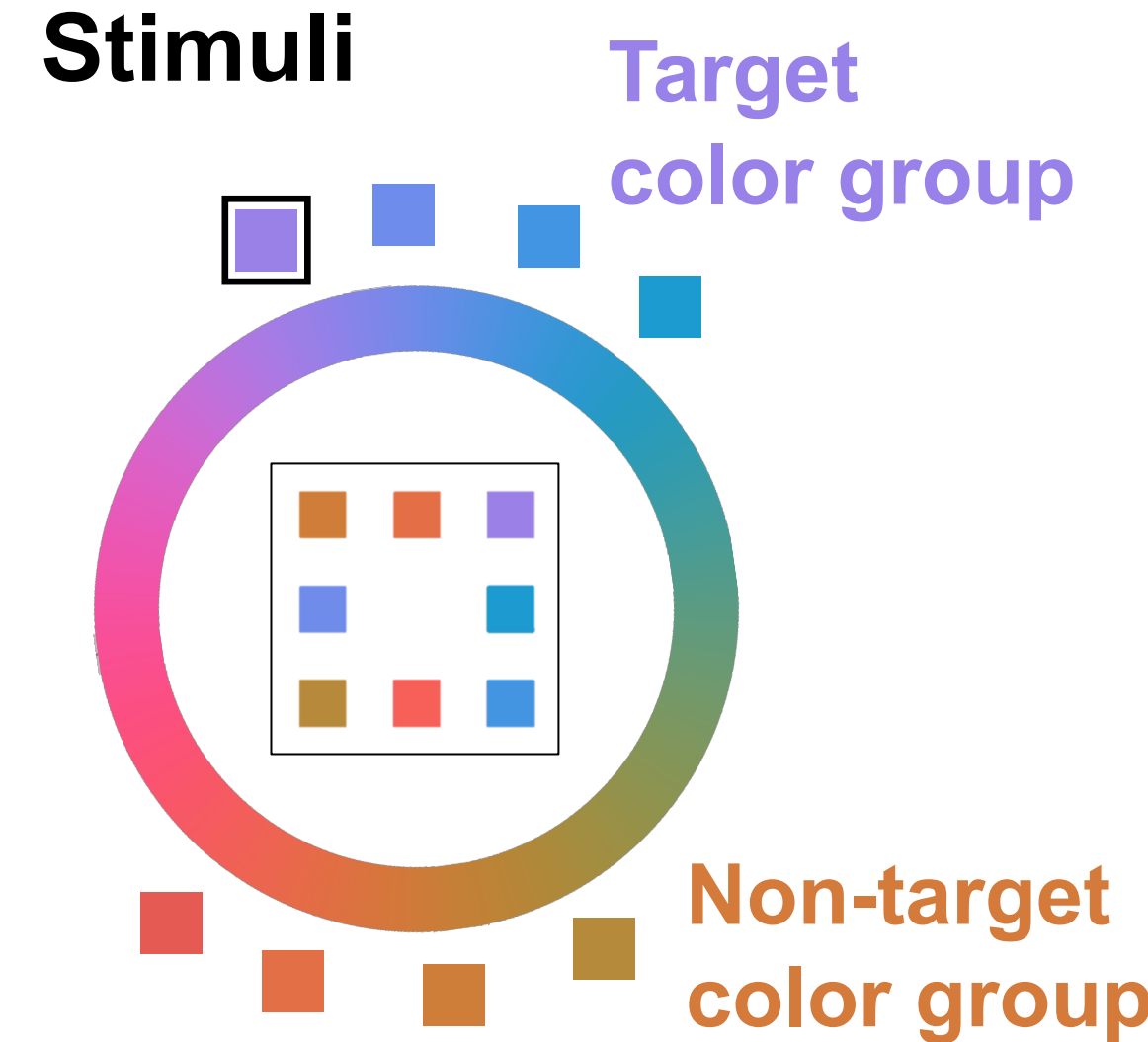
To test the effect of saccades.

#### 2) Delay condition

To compare visual perception near (*short delay*) and far (*long delay*) from saccadic eye movement.

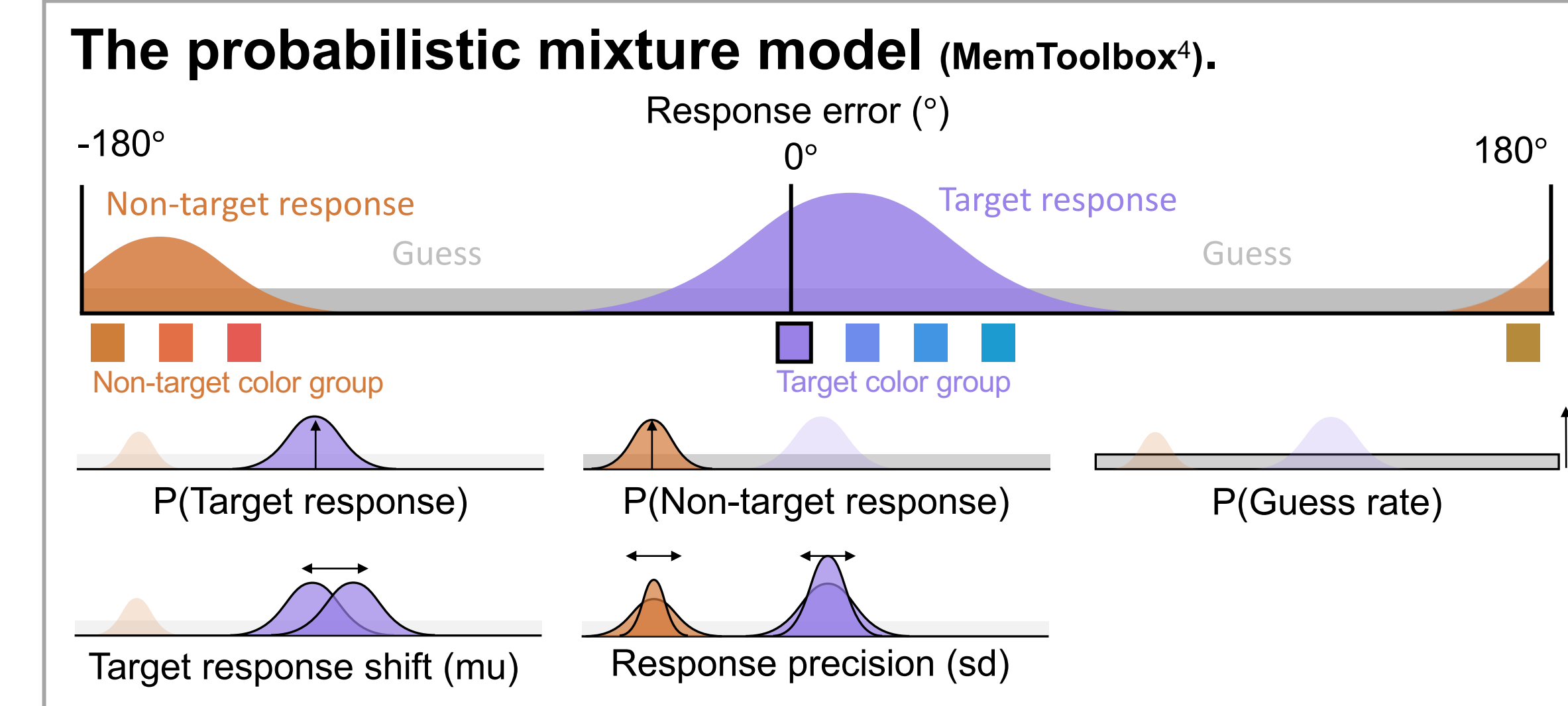


### Stimuli



### Influence of global stimulus regularity

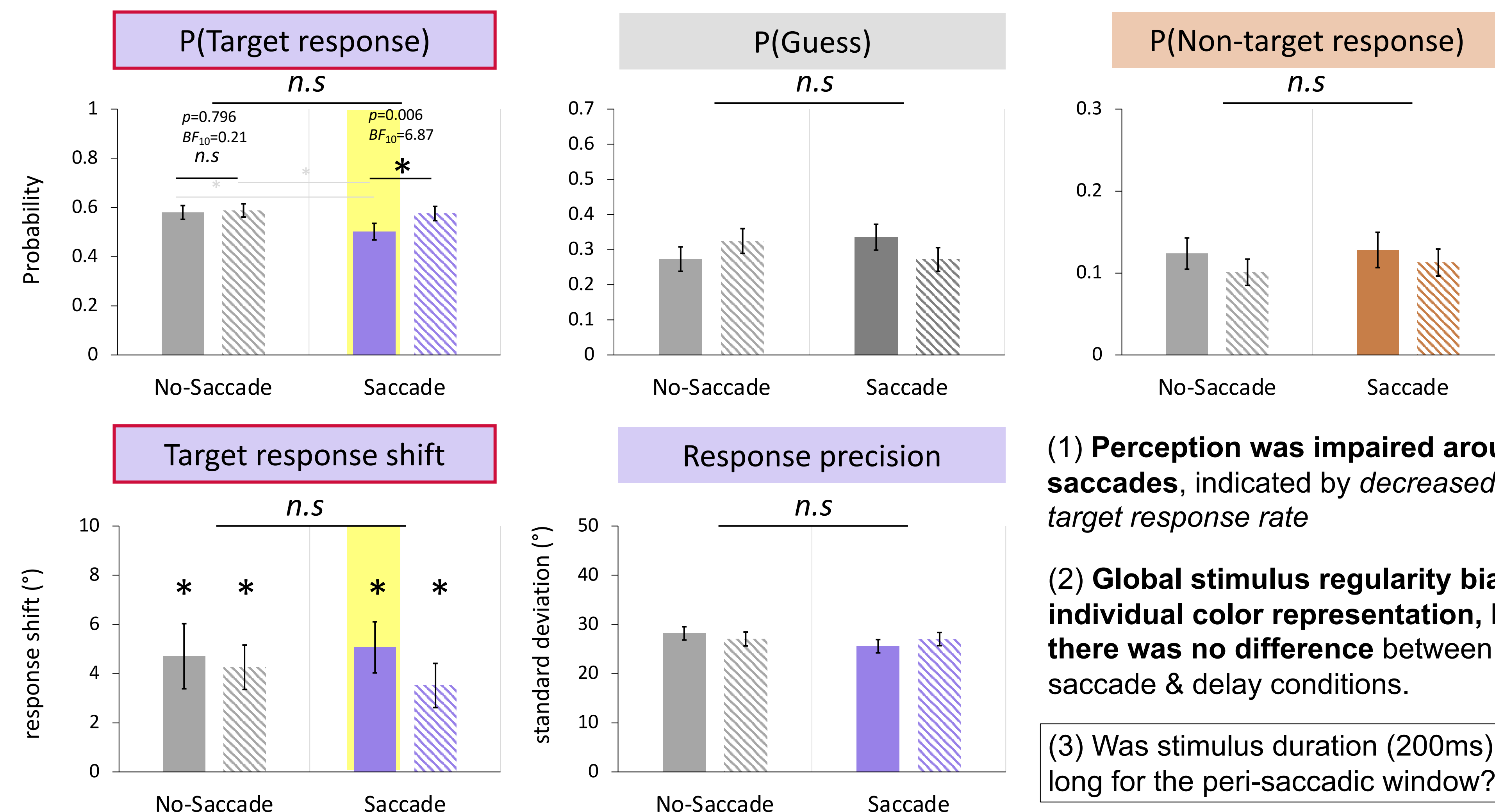
- Response bias toward the mean color of the target color group<sup>3</sup>
- Incorrect reports of non-target color group



## Results

### Experiment 1 (N=27)

■ Short delay ■ Long delay



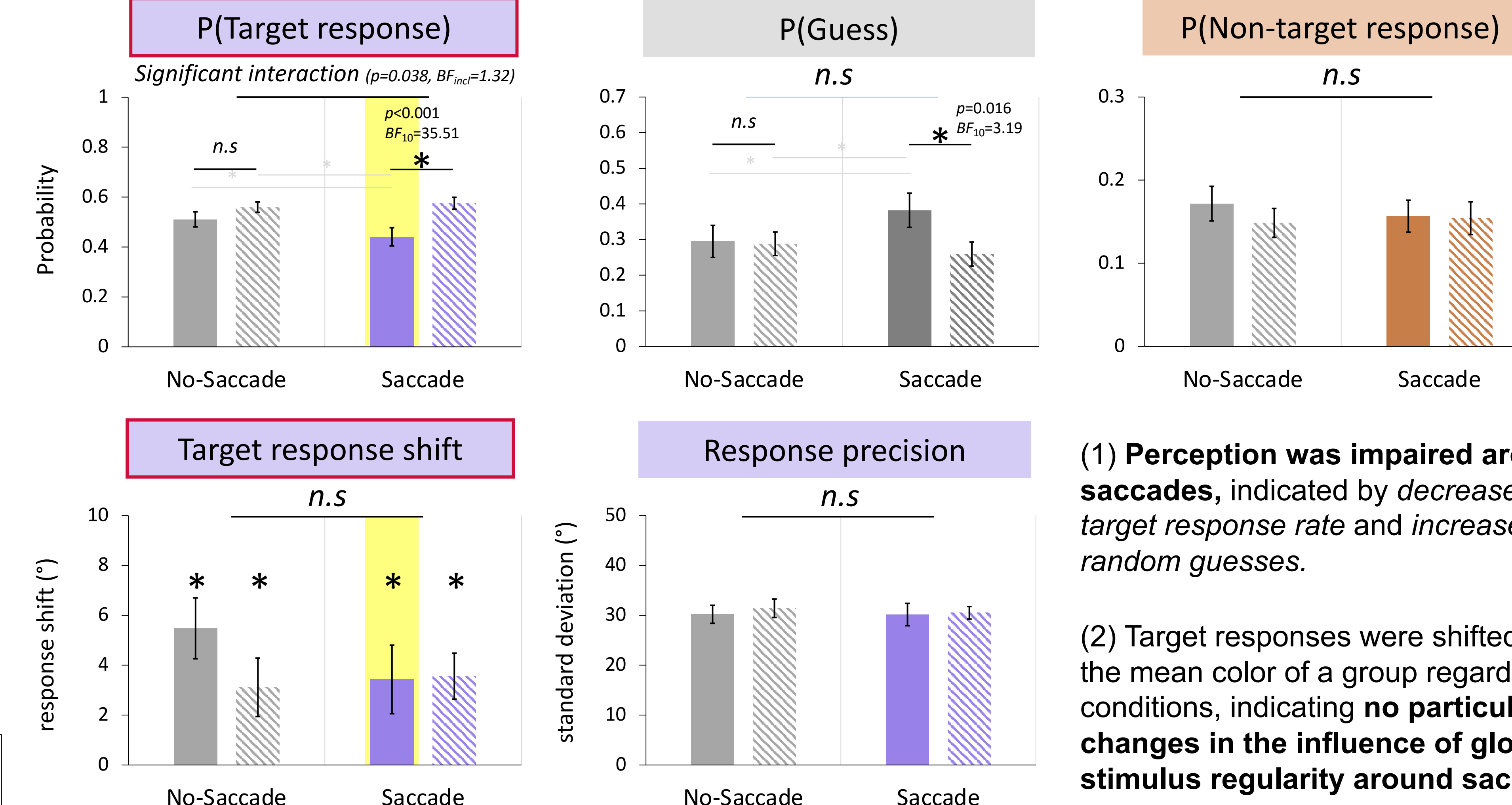
(1) Perception was impaired around saccades, indicated by decreased target response rate

(2) Global stimulus regularity biased individual color representation, but there was no difference between saccade & delay conditions.

(3) Was stimulus duration (200ms) too long for the peri-saccadic window?

### Experiment 2 (N=25, collecting)

■ Short delay ■ Long delay



(1) Perception was impaired around saccades, indicated by decreased target response rate and increased random guesses.

(2) Target responses were shifted toward the mean color of a group regardless of conditions, indicating no particular changes in the influence of global stimulus regularity around saccades.

To restrict stimuli to the peri-saccadic window, we reduced stimuli duration (200 → 100 ms) and limited stimuli presentation within the time window.

## Summary

- 1) We presented stimulus arrays with color regularities perisaccadically (saccade short delay), and used mixture modeling to assess performance and error measures compared to no-saccade or later post-saccade stimuli.
- 2) Consistent with prior findings, we found impaired peri-saccadic perception, in a form of the decreased probability of reporting target color and increased guess rate.
- 3) The influence of global stimulus regularity did not change peri-saccadically, indicated by consistent bias toward the mean color of a group regardless of condition.

## References

- <sup>1</sup>Golomb et al., (2014). Feature-binding errors after eye movements and shifts of attention. *Psychological science*.
- <sup>2</sup>Ross et al., (2001). Changes in visual perception at the time of saccades. *Trends in Neurosciences*.
- <sup>3</sup>Brady & Alvarez (2011). Hierarchical encoding in visual working memory: Ensemble statistics bias memory for individual items. *Psychological Science*.
- <sup>4</sup>Suchow et al., (2013). Modeling visual working memory with the MemToolbox. *Journal of Vision*.