

# Prior dynamic experience modulates spatial attentional rhythm

Yu-Ang Cheng<sup>1</sup>, Huan Luo<sup>1,2,3, \*</sup>

- 1. School of Psychological and Cognitive Sciences, Peking University, China.
- 2. PKU-IDG/McGovern Institute for Brain Research, Peking University, China,
- 3. Beijing Key Laboratory of Behavior and Mental Health, Peking University, China

## INTRODUCTION

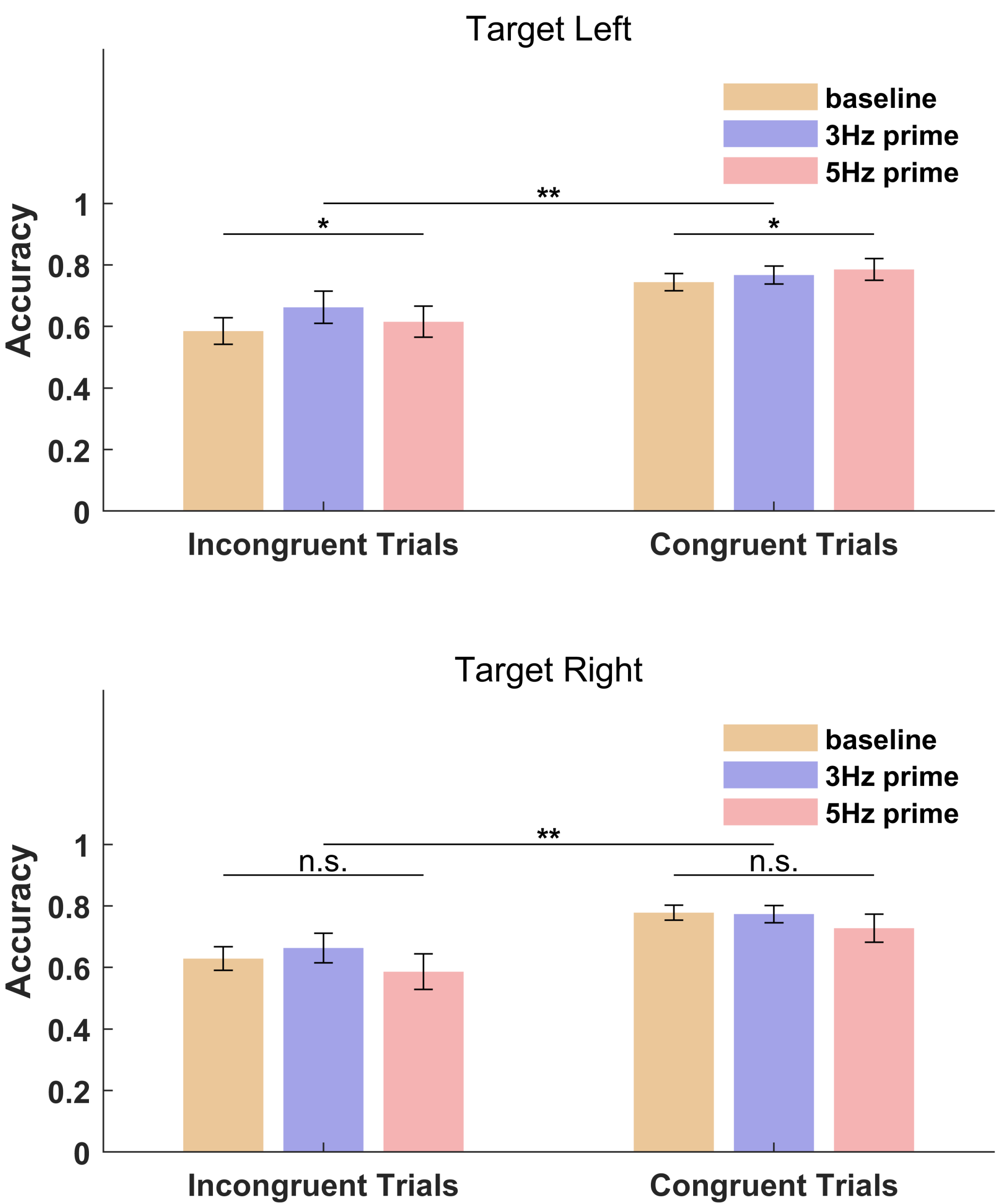
The brain efficiently coordinates its limited resources over external information through attention. It is well established that attention can improve behavioral performance by selectively focusing on the most task-relevant information. Interestingly, by taken a temporal perspective, recent studies propose that attention works in a dynamic way rather than remain stationary. These experiments demonstrate that multiple locations, objects, and features are rhythmically sampled over time (Laudau & Fries, 2012; Fiebelkorn et al., 2013; Re et al., 2019). However, it remains largely unknown whether attentional rhythm is inherently hardwired or can adapt to prior experience and changes flexibly. Therefore, we used time-resolved behavioral measurements on 25 human subjects to examine whether externally induced rhythm in prior experience would influence spatial attentional rhythm.

## METHODS

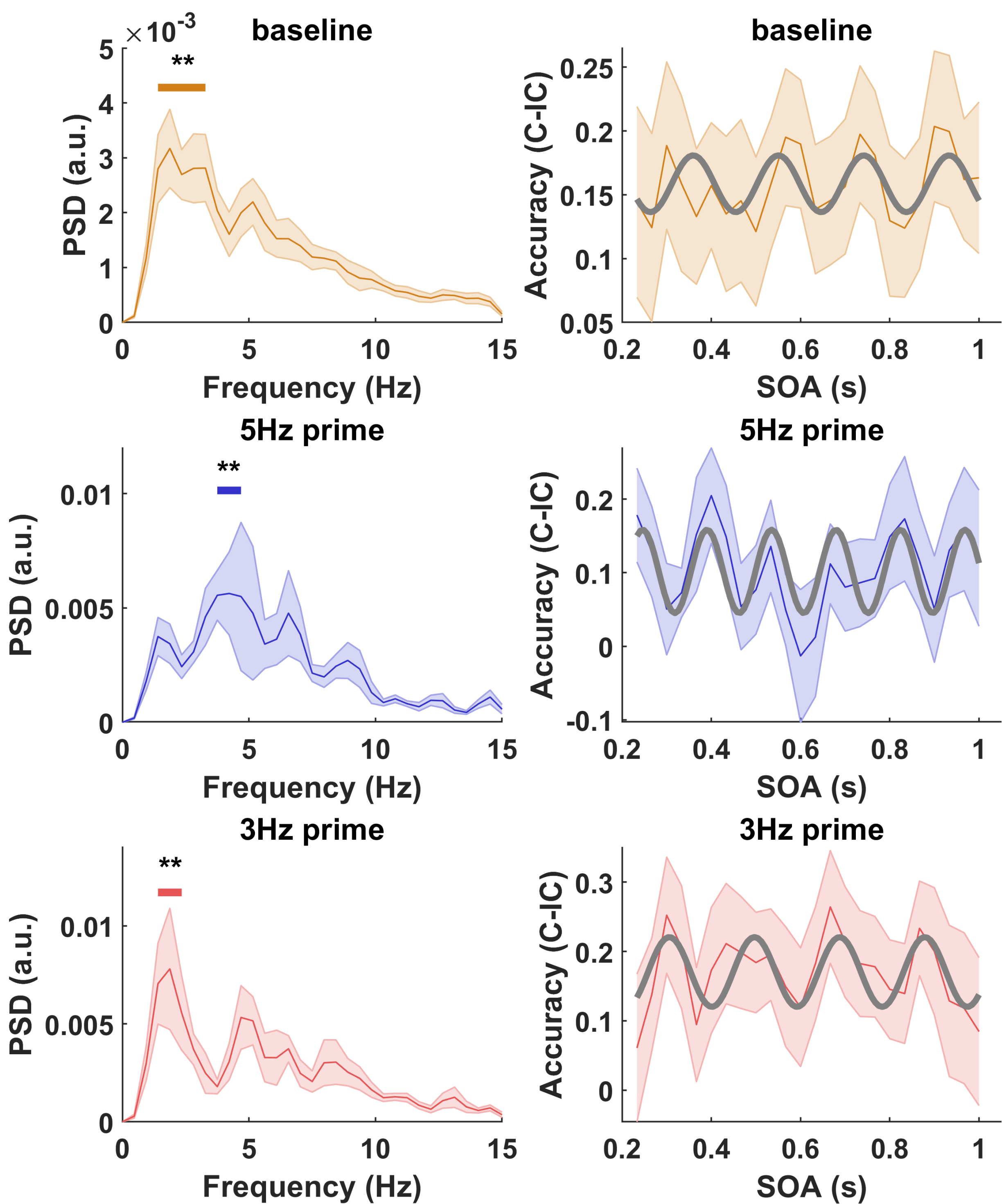
Each trial began with a fixation screen for 1000 to 1200 ms and a drifting grating screen for 1250 to 2500 ms. Then, subjects were exposed to a rhythmic prime, i.e., a near-threshold stimulus presented alternatively between two spatial locations for 2500 ms at 3 Hz or 5 Hz. Next, after a varied time interval (200 to 1000 ms in steps of 33 ms), a near-threshold probe appeared at one of the two locations. Subjects needed to detect the target and the accuracies were measured. The precise amplitude of the target was adjusted individually during a 1-up-1-down staircase procedure in advance to achieve a 50% threshold.

Throughout the experiment, each subject must first complete a pretest condition without the rhythmic prime to collect the baseline of attentional rhythm, and a posttest condition with a random 3Hz or 5Hz rhythmic prime to test the effect of externally induced rhythm. In each condition, each time lag on a given relative location was repeated 20 times per subject.

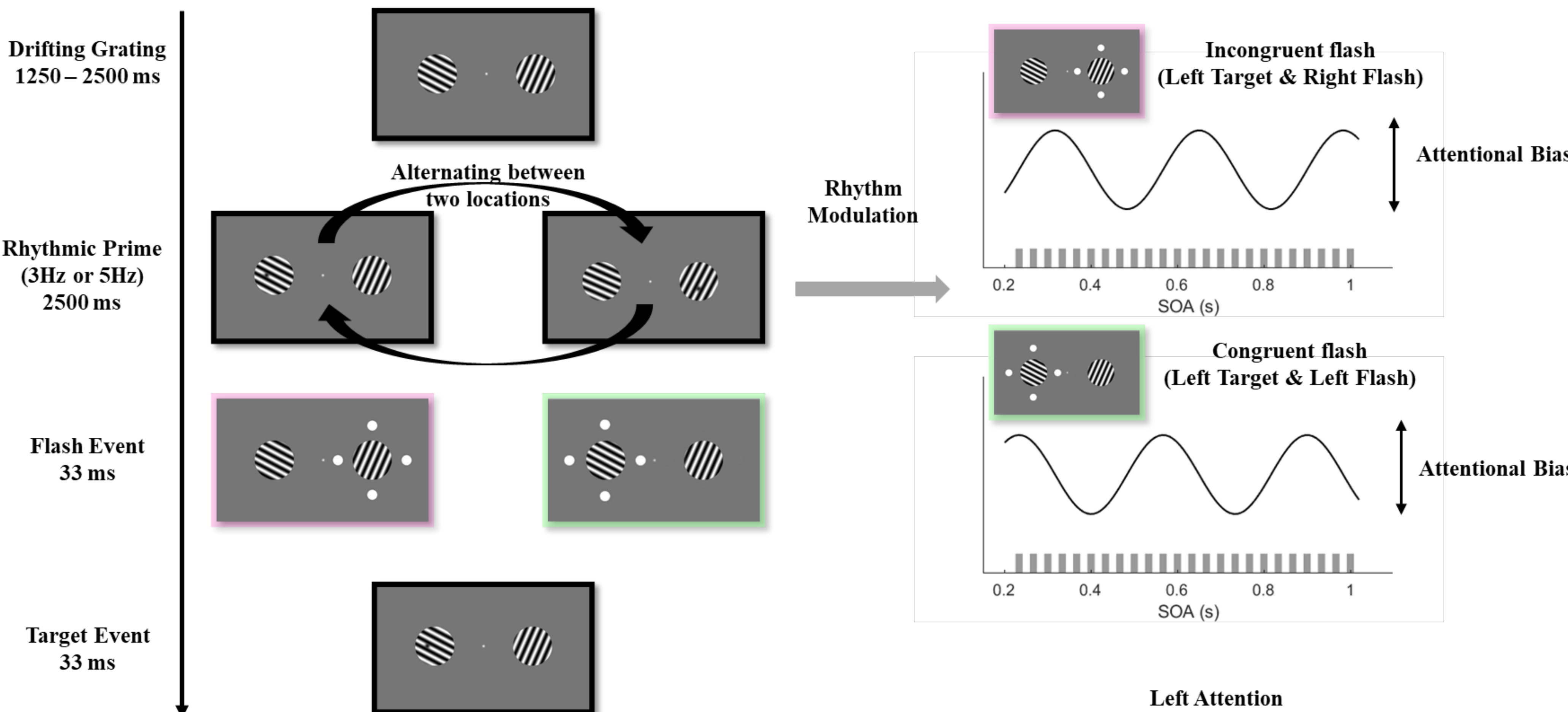
## Overall Performance



## Accuracy Time Courses and Spectral Analysis



## Experimental Procedure and Design



## REFERENCES

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## CONCLUSIONS

Taken together, our results suggest that visual attentional rhythm is not a fixed clock and could be modulated by and adapt to prior dynamic experience.