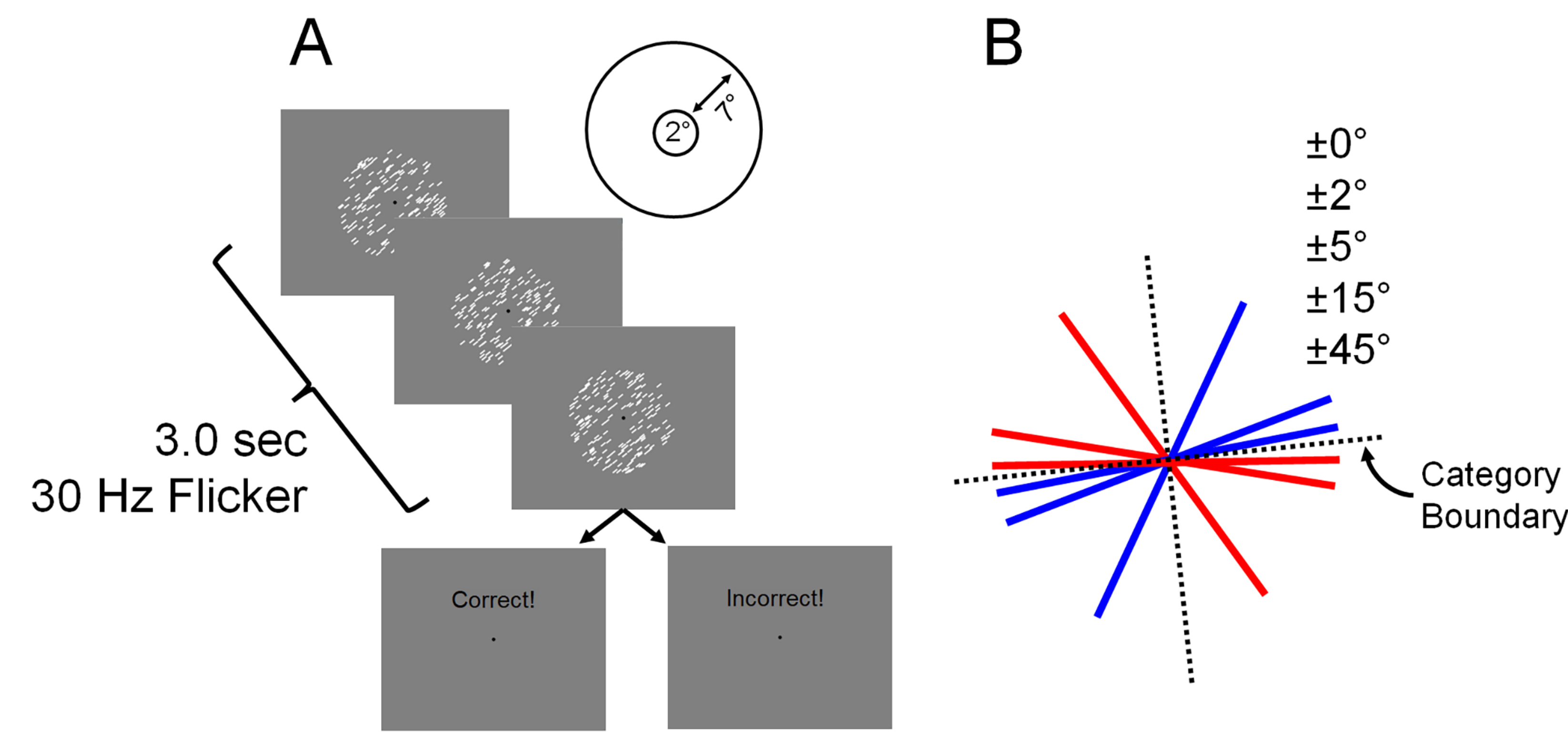


Introduction

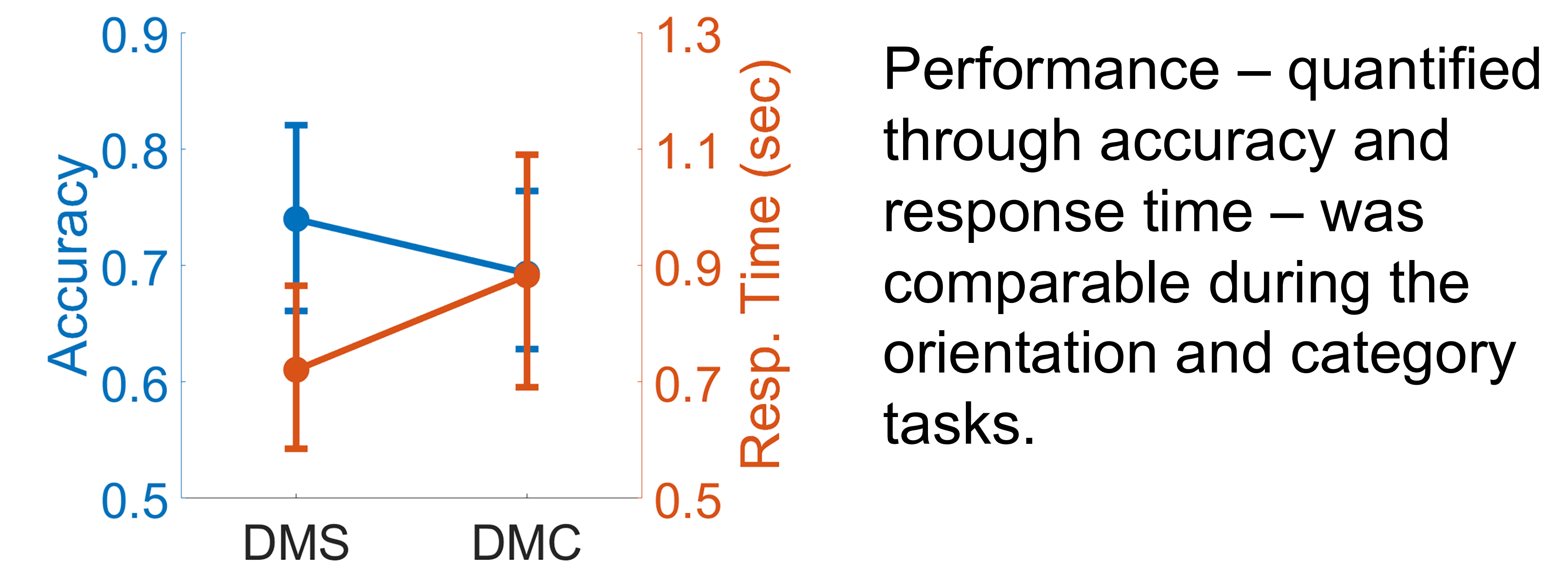
- Categorization describes the process of assigning meaning to stimuli.
- Several lines of evidence suggest that brain areas involved in oculomotor control contribute to categorization (e.g., Rosen & Freedman, 2025)
- In recent work, we showed that it is possible to decode the category of a stimulus – its meaning – from subtle patterns of involuntary eye movements (microsaccades; Caron & Ester, 2026)

Phase 1 - Category Training

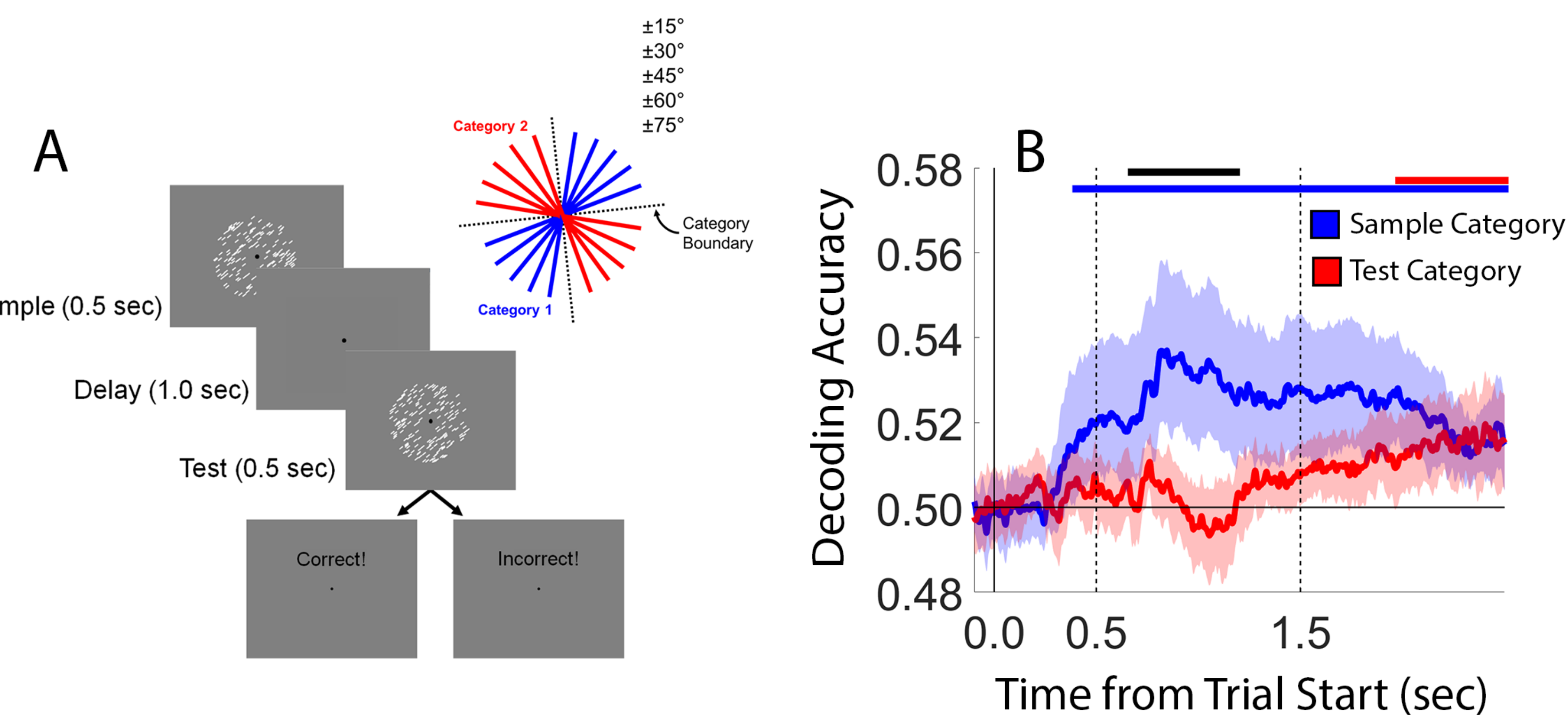


- In the Phase 1 of the experiment, participants learned to classify oriented stimuli according to a learned boundary.

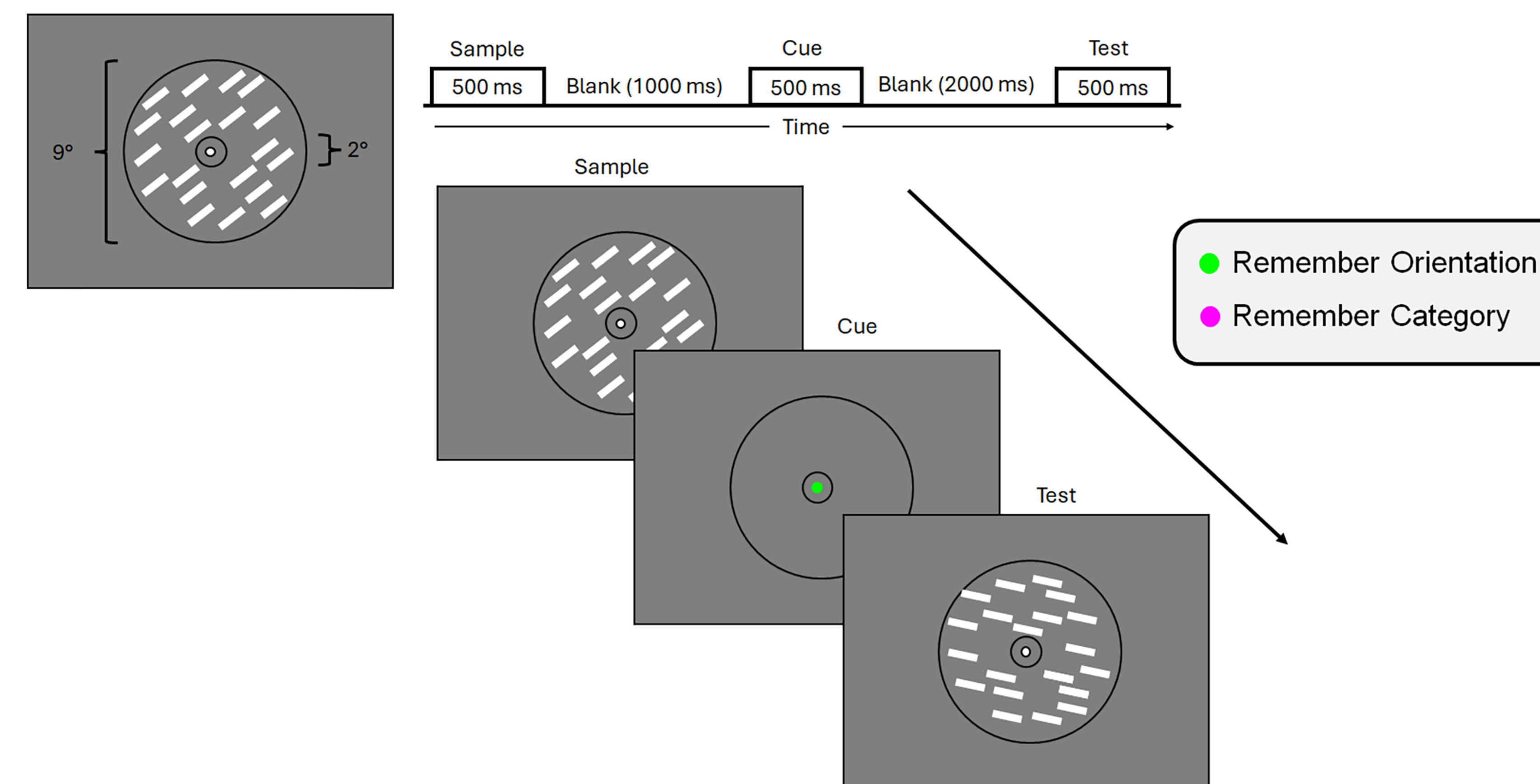
Preliminary Results (N = 7)



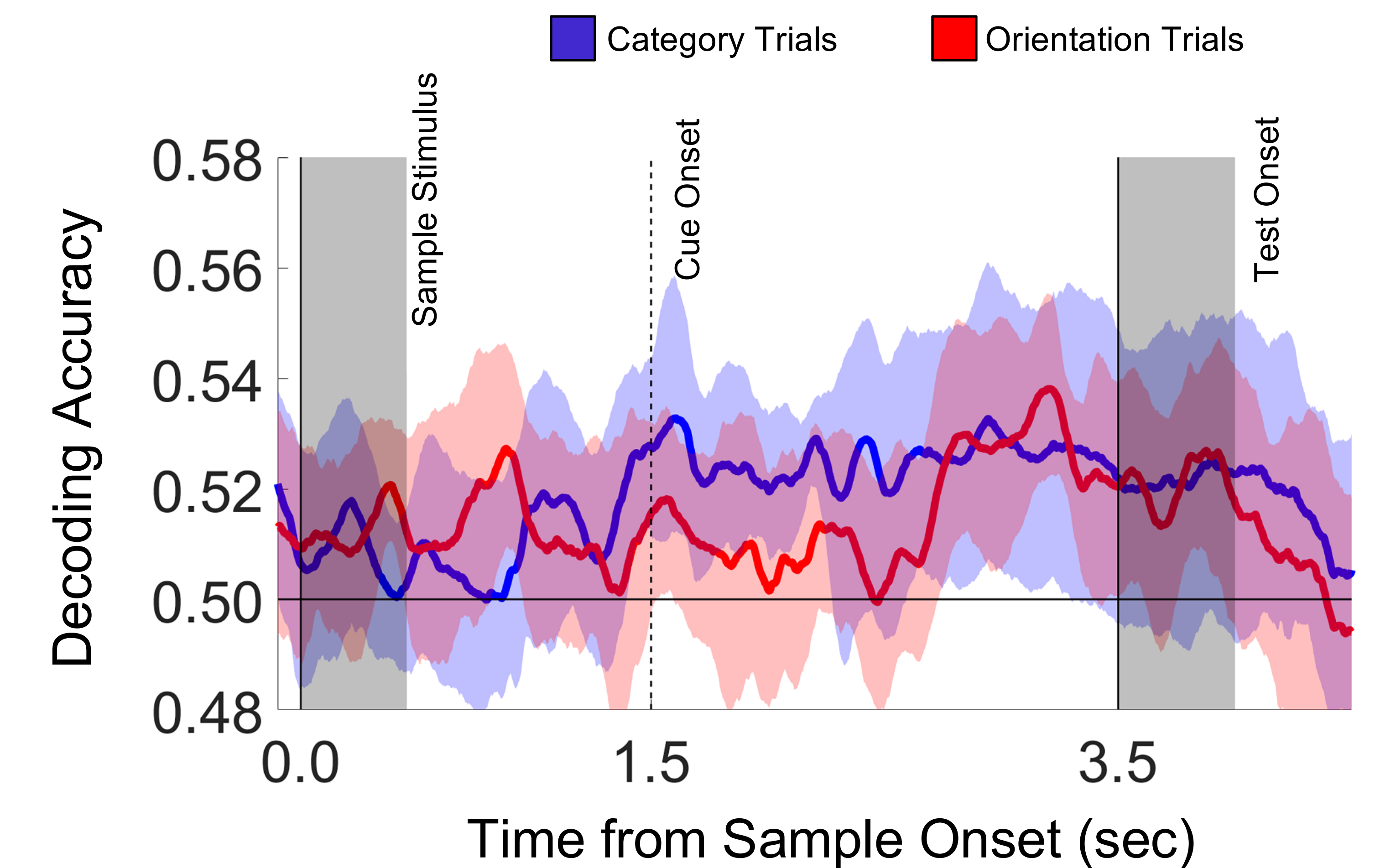
Performance – quantified through accuracy and response time – was comparable during the orientation and category tasks.



Phase 2 - Task Switching



- In Phase 2 of the experiment, participants were retrospectively cued to compare the orientations or category membership of successively presented stimuli.
- **H1 predicts** that category-selective eye movements should be observed during the orientation and category tasks; **H2 predicts** that category-selective eye movements should only be present during the category task.



- Category decoding performance was generally more robust during category trials compared to orientation trials, though results are preliminary

Why do Category-Selective Eye Movements Occur?

H1: A learned strategy brought about by extensive category training

H2: A flexible and adaptive re-configuration of the oculomotor plant

We tested these hypotheses by examining the extent to which category-selective eye movements emerge in real time following changes in task demands.

Applications

- These data add to a growing literature indicating that real-time eye movements can be used to monitor cognitive states.
- Eyetracking is inexpensive and portable, allowing extensions of our findings in clinical and applied states (e.g., performance monitoring in TSA baggage screeners).