

# Failing to Integrate Feature Representations During Visual Search

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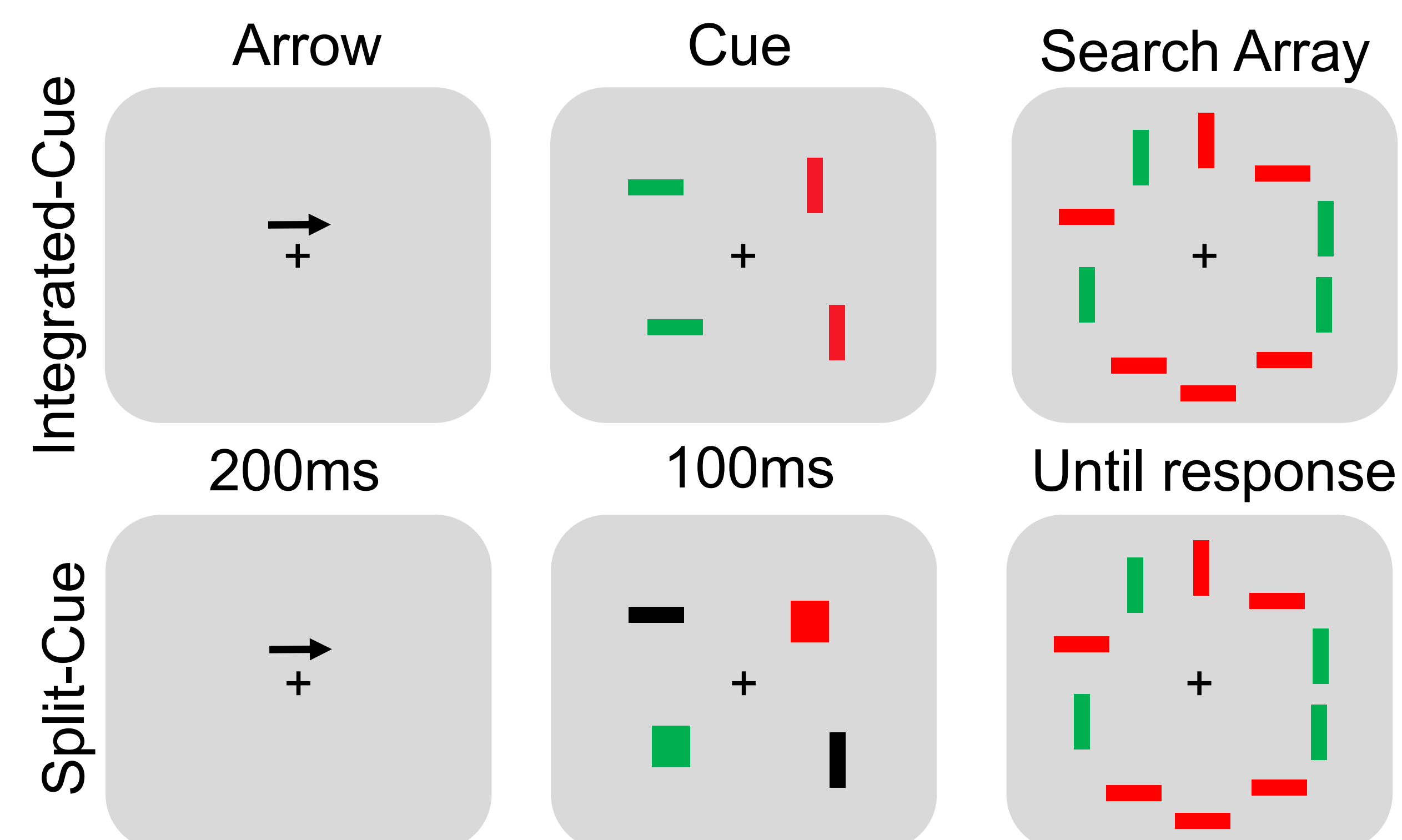
## Background

- Observers can flexibly modify a target representation to meet task demands and to improve search performance<sup>1</sup>.
- Contralateral Delay Activity, defined as the difference in amplitude over parietal-occipital regions contralateral compared to ipsilateral to the cue display, reflects the number of search targets in Visual Working Memory<sup>2</sup>.

## Research Question

Do observers create a single integrated target representation when searching for the conjunction of two spatially separate target features?

## Methods



Respond whether a conjunction target is present or not.

## Hypotheses & Prediction

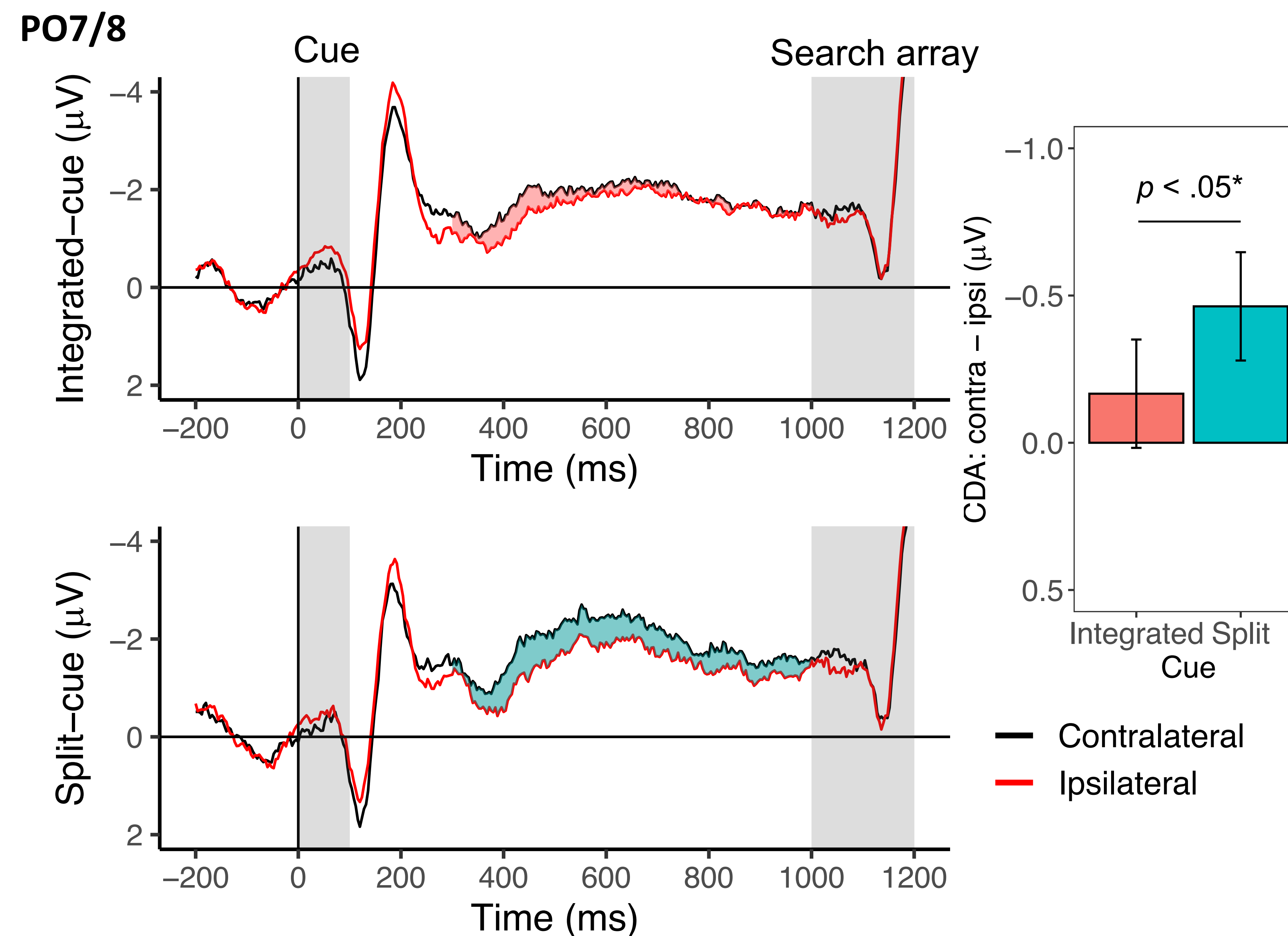
### Integrated-Template Hypothesis

- Similar CDA amplitudes and RTs between Split-Cue and Integrated-Cue conditions.

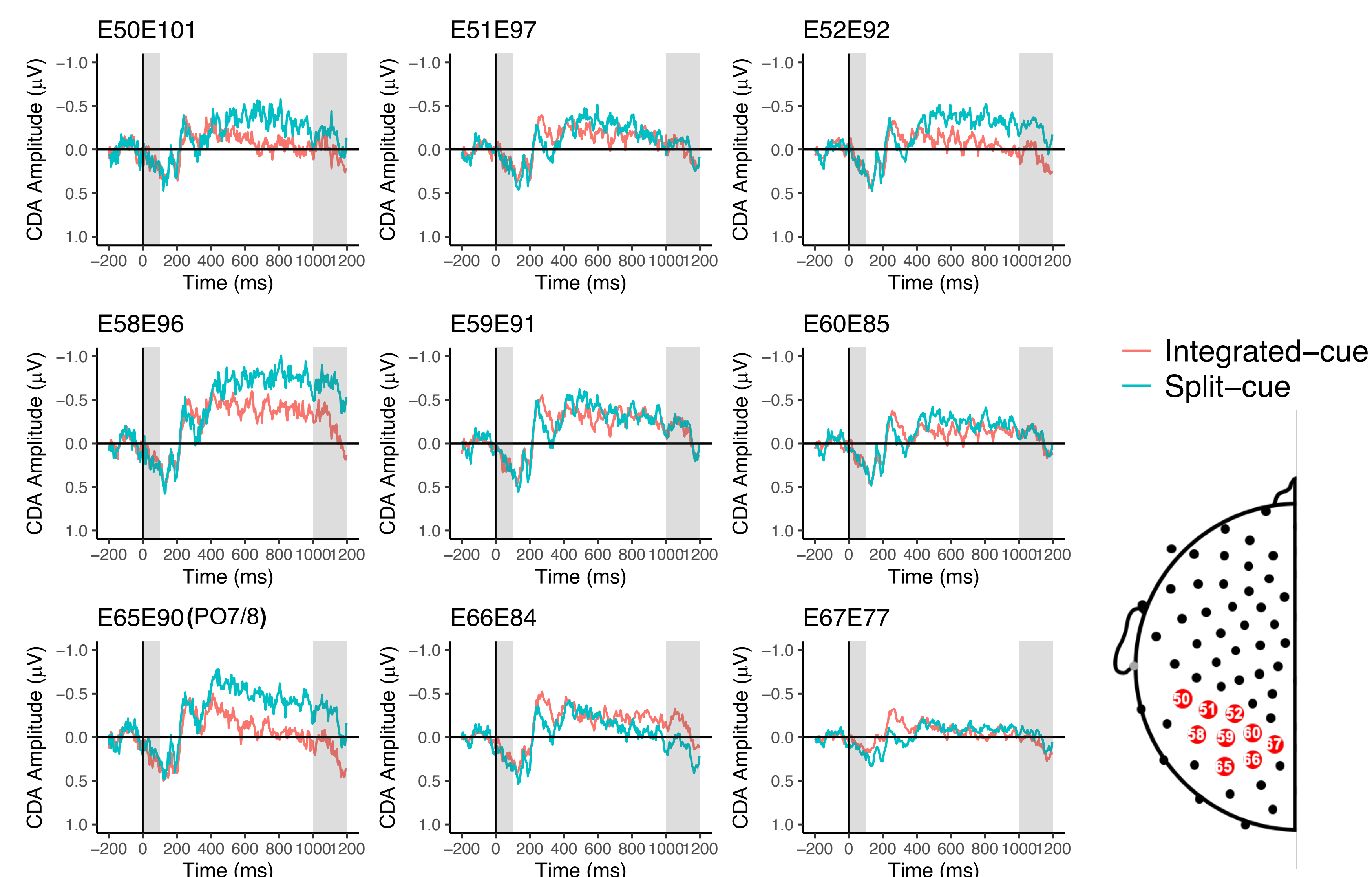
### Separate-Template Hypothesis

- Larger CDA amplitude and slower RT for Split-Cue than Integrated-Cue condition.

## CDA Results

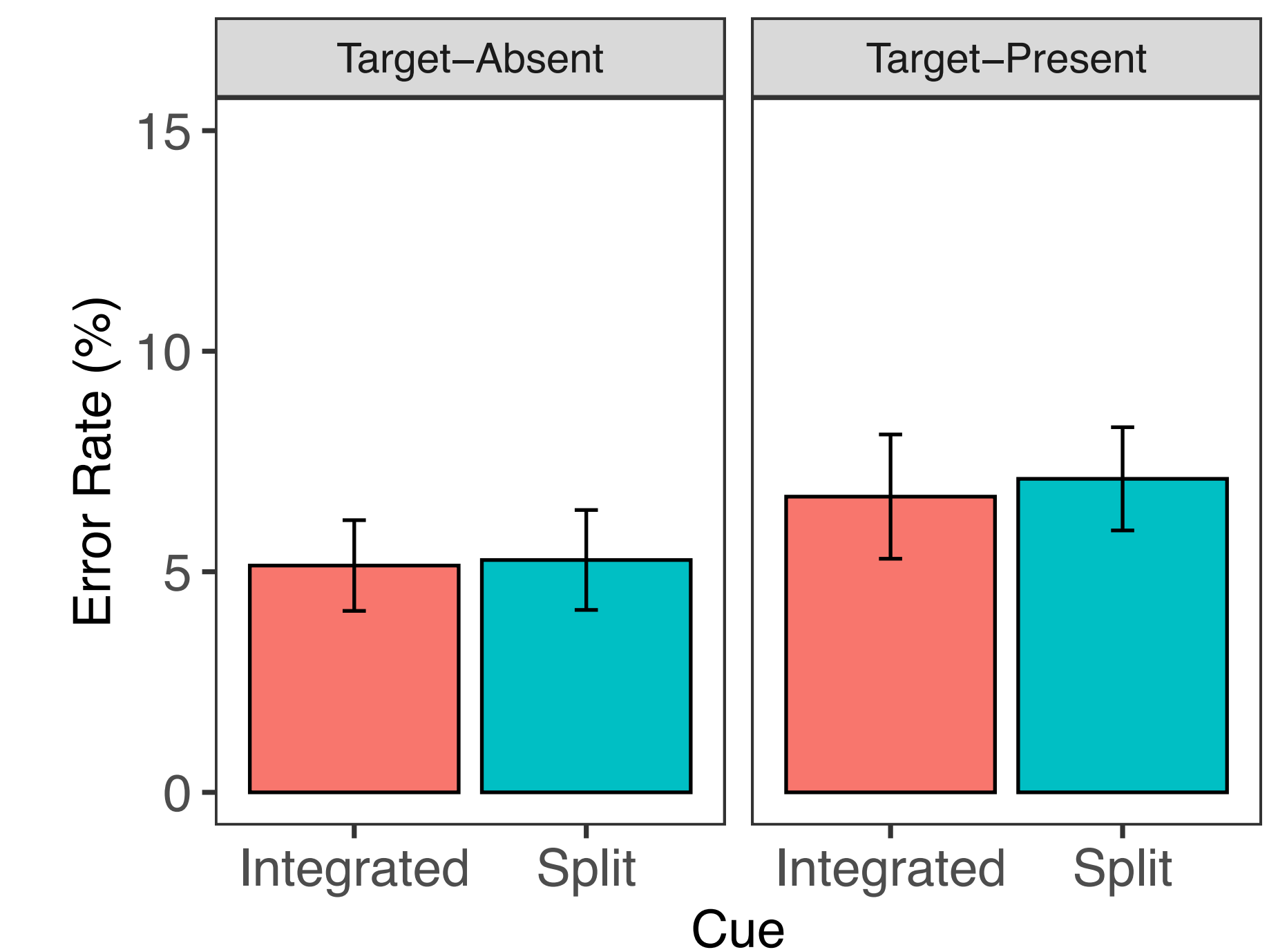


Amplitude difference between contralateral and ipsilateral hemispheres (CDA) was larger the **Split-Cue** condition than the **Integrated-Cue** condition,  $p < .05$

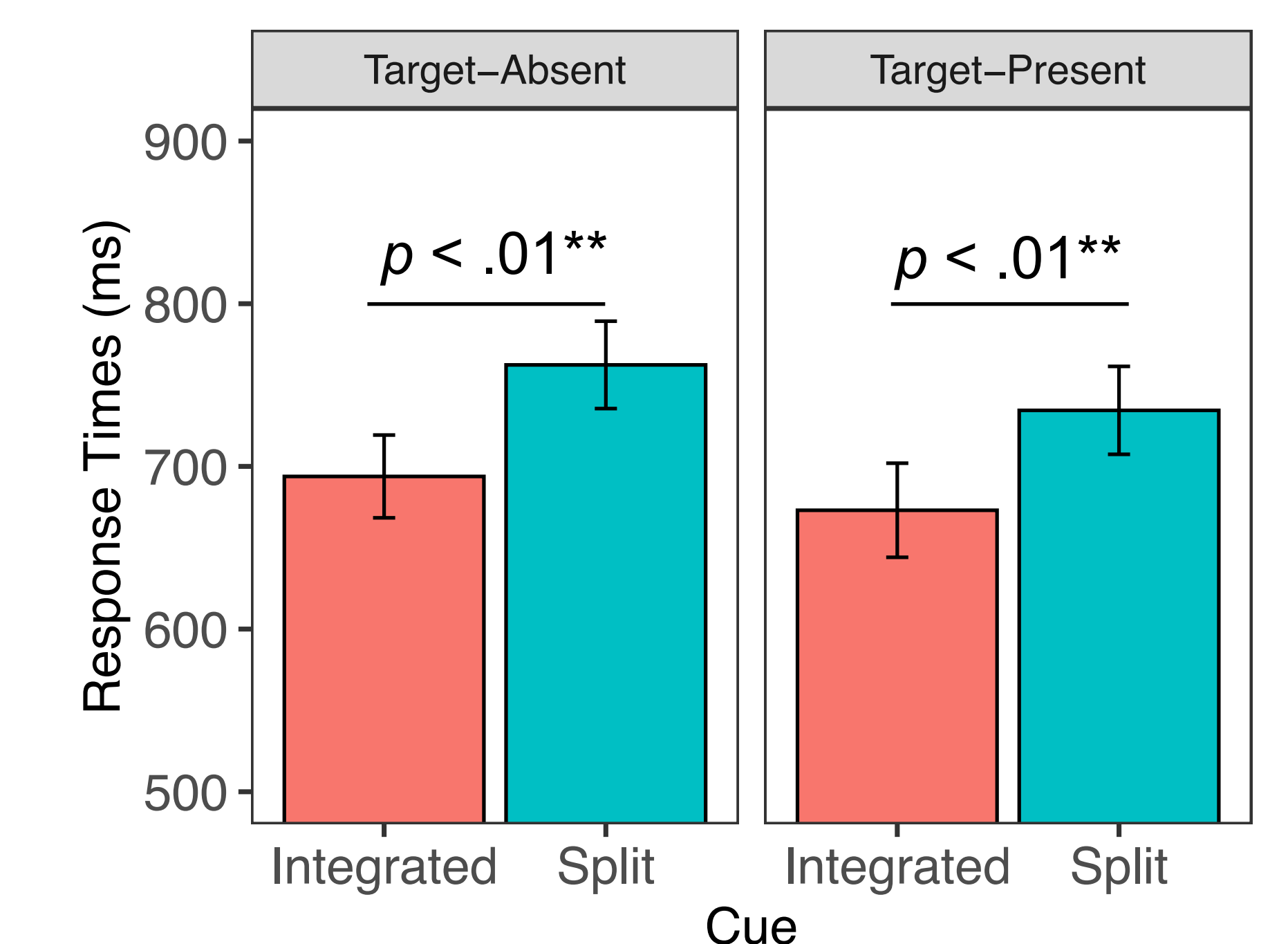


We found similar cue differences across the parietal-occipital areas, with larger differences at lateral electrodes than medial electrodes,  $p < .01$ .

## Behavioral Results



No significant difference in error rates between the two cue conditions,  $p = .3$



RT was slower for the **Split-Cue** than **Integrated-Cue** condition,  $p < .01$

## Conclusion

- Participants did not integrate the features and instead held two separate representations (support *Separate-Template Hypothesis*).
- There results have implications for how untrained observers typically search, as well as for training that could improve search under real-world conditions.

### REFERENCES

1. Geng, J. J., & Witkowski, P. (2019). Template-to-distractor distinctiveness regulates visual search efficiency. *Current Opinion in Psychology*, 29, 119–125.
2. Carlisle, N. B., Arita, J. T., Pardo, D., & Woodman, G. F. (2011). Attentional Templates in Visual Working Memory. *Journal of Neuroscience*, 31(25), 9315–9322.

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