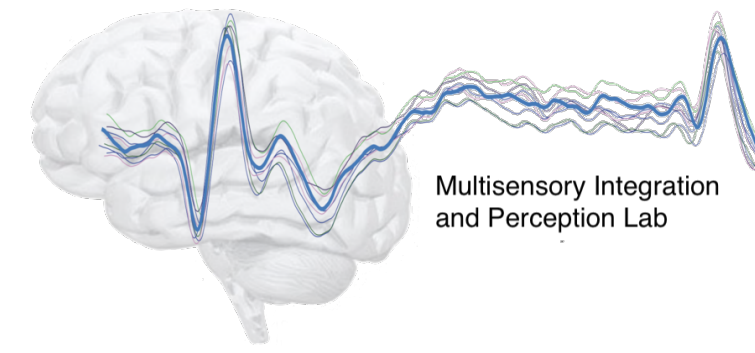


Feature-based attention resolves differences in target-distractor similarity through multiple mechanisms

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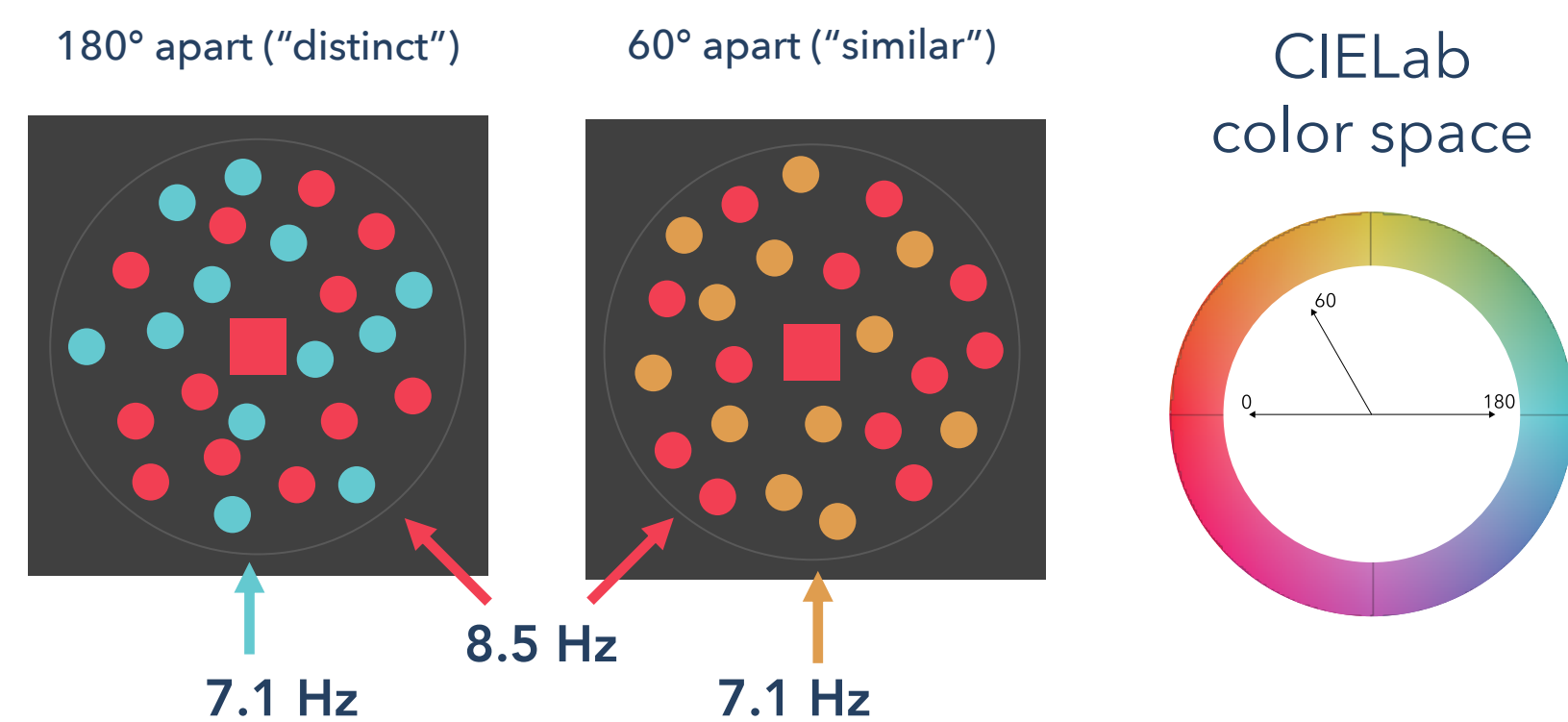
Background

Attention to a visual feature (e.g., the color red) enhances processing of target over non-target features^{1,2}

Neural models suggest that feature similarity matters, but most studies have investigated feature-based attention using distinct features^{3,4}

What are the mechanisms involved when attending to target features among similar or distinct distractors?

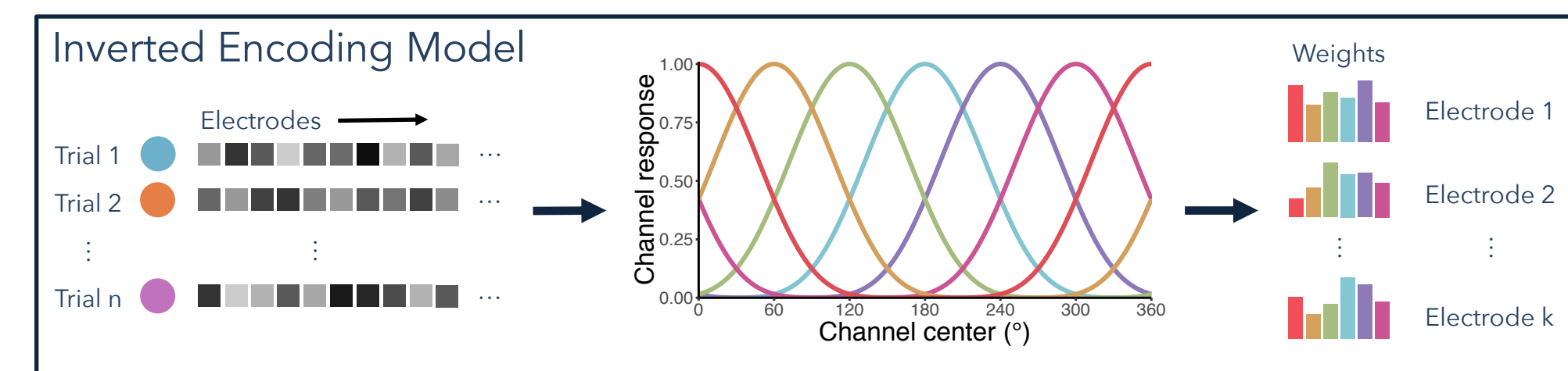
Method



Subjects ($n = 16$) attended all dots in one color to detect brief intervals of motion coherence. Performance was thresholded to 80% accuracy in each condition.

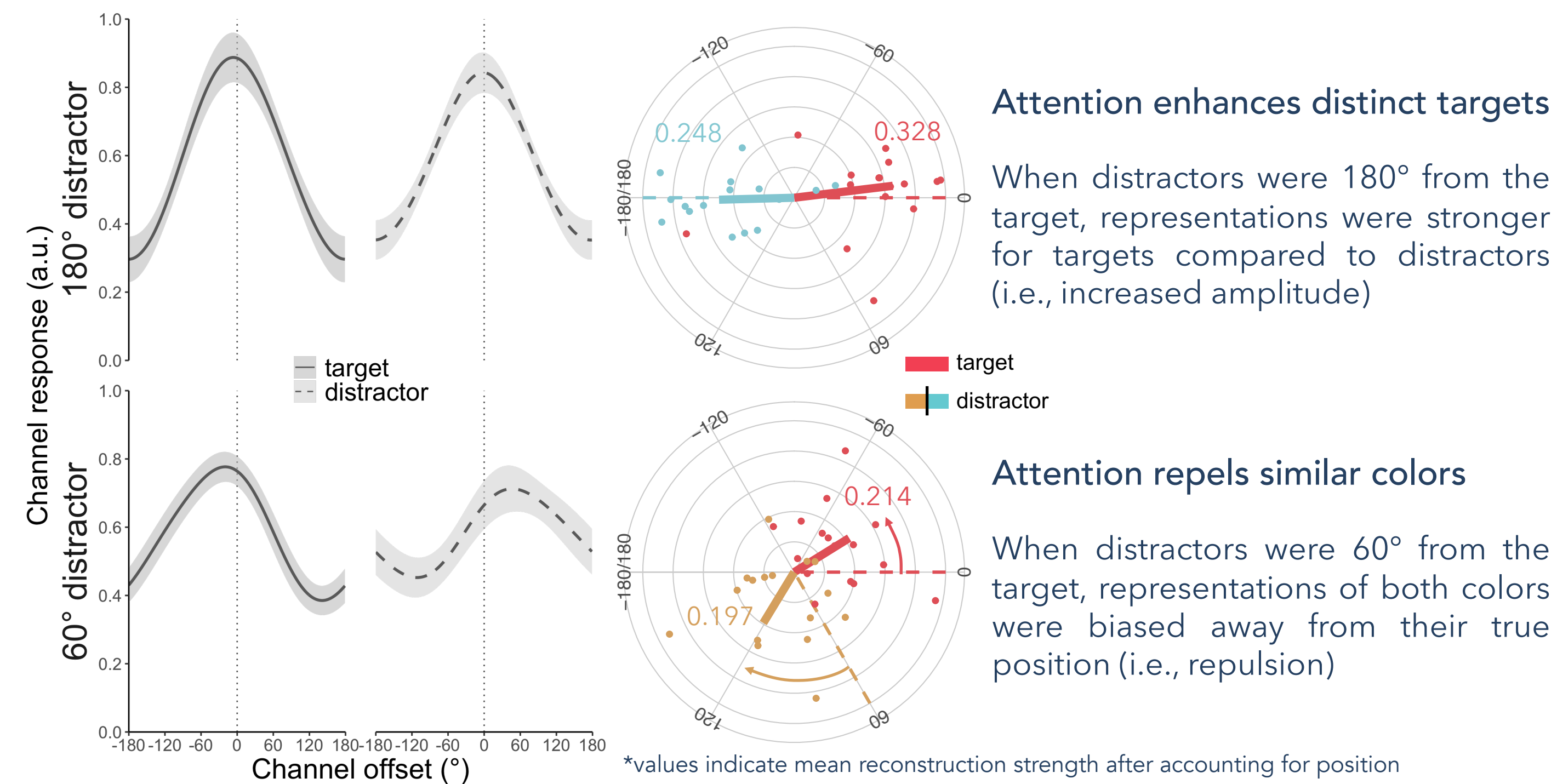
We measured steady-state visual evoked potentials (SSVEPs) at two frequencies (counterbalanced across targets and distractors)

Results



*IEM was fit using a leave one run out cross-validation procedure⁵

Using IEM, we could accurately reconstruct the color of targets and distractors in both conditions



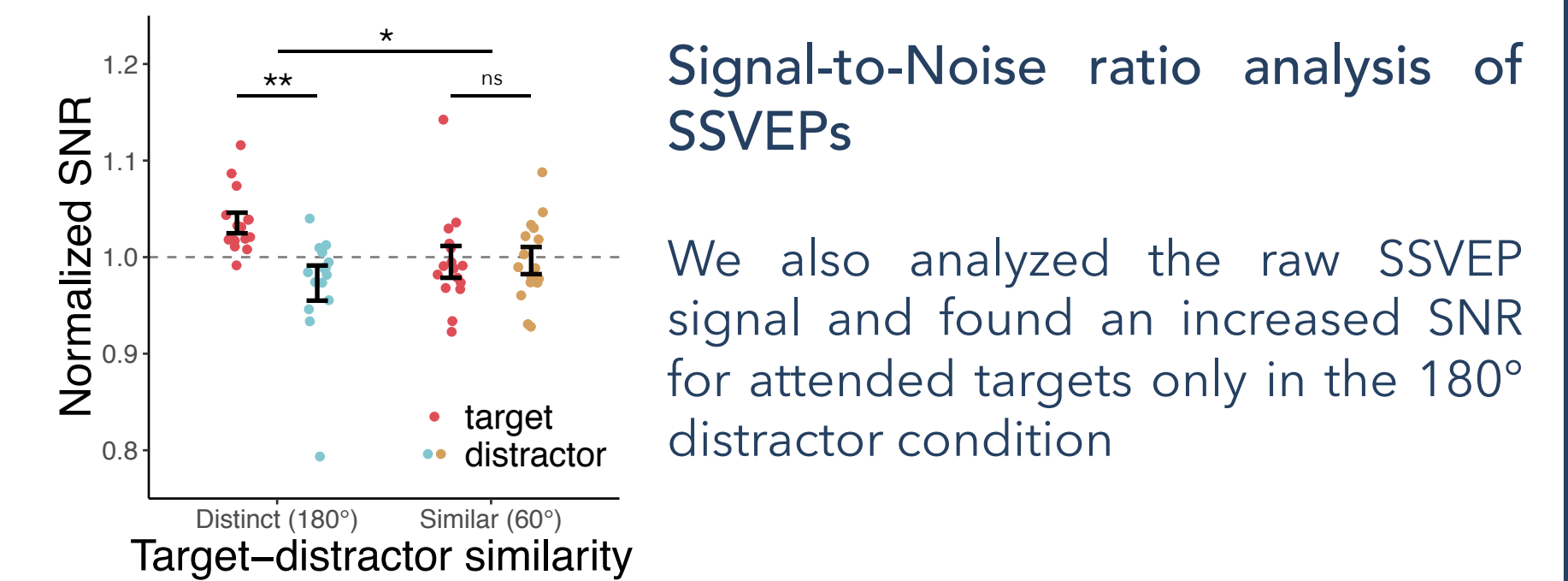
Attention enhances distinct targets

When distractors were 180° from the target, representations were stronger for targets compared to distractors (i.e., increased amplitude)

Attention repels similar colors

When distractors were 60° from the target, representations of both colors were biased away from their true position (i.e., repulsion)

*values indicate mean reconstruction strength after accounting for position



Signal-to-Noise ratio analysis of SSVEPs

We also analyzed the raw SSVEP signal and found an increased SNR for attended targets only in the 180° distractor condition

Conclusions

- The topography of SSVEPs contains information about both attended and unattended features
- Attention uses multiple mechanisms to resolve target-distractor competition:
 - Increasing amplitude when targets are distinct
 - Biasing similar representations away from each other
- Further investigation of psychological spaces of different visual features will enable better understanding of the functional role of these mechanisms

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