Transcranial alternating current stimulation affects motion adaptation in V1 and MT neurons in awake, behaving macaques

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Introduction

Previous Observation:
- tACS reduces motion aftereffect (MAE) in human subjects.

Current Hypothesis:
- Subthreshold rhythmic membrane voltage modulations produced by tACS reduce adaptation in motion selective neurons.

Current Approach:
- To explicitly test this hypothesis, we recorded from neurons in area MT (n=69; 55+14) and V1 (n = 66; 35+31) in awake, behaving macaques while applying tACS.

Electrophysiology Design

Effect on MT cells

- Tuning Amplitude (TA)
  - tACS reduces adaptation induced by adaptation

- Tuning Width (TW)
  - tACS reduces sharpening induced by adaptation
  - tACS reduces broadening induced by adaptation

Evoked LFPs in MT

- Tuning Amplitude
  - tACS reduces facilitation induced by adaptation
  - tACS reduces suppression induced by adaptation

- Tuning Width
  - tACS reduces broadening induced by adaptation

Effect on V1 cells

- Tuning Amplitude
  - TA changes in V1 are similar to MT.

- Tuning Width
  - TW changes in V1 are similar to MT.

References


Take-Home Messages

- tACS mitigates the effects of motion adaptation measured behaviorally.
- Macaque Electrophysiology: tACS mitigates changes in tuning amplitude and width in motion adapted MT and V1 neurons.

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