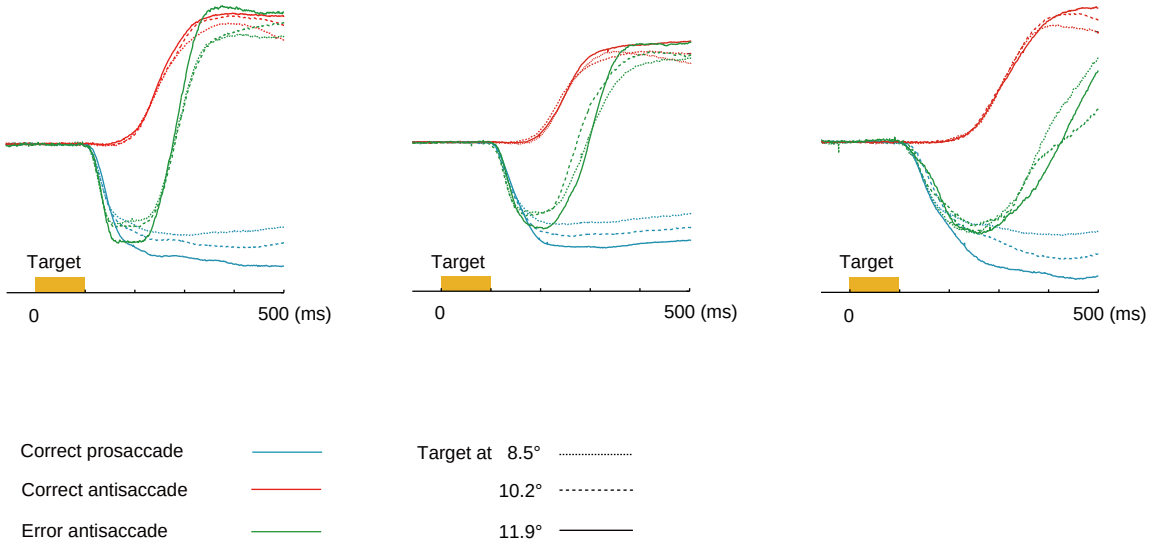
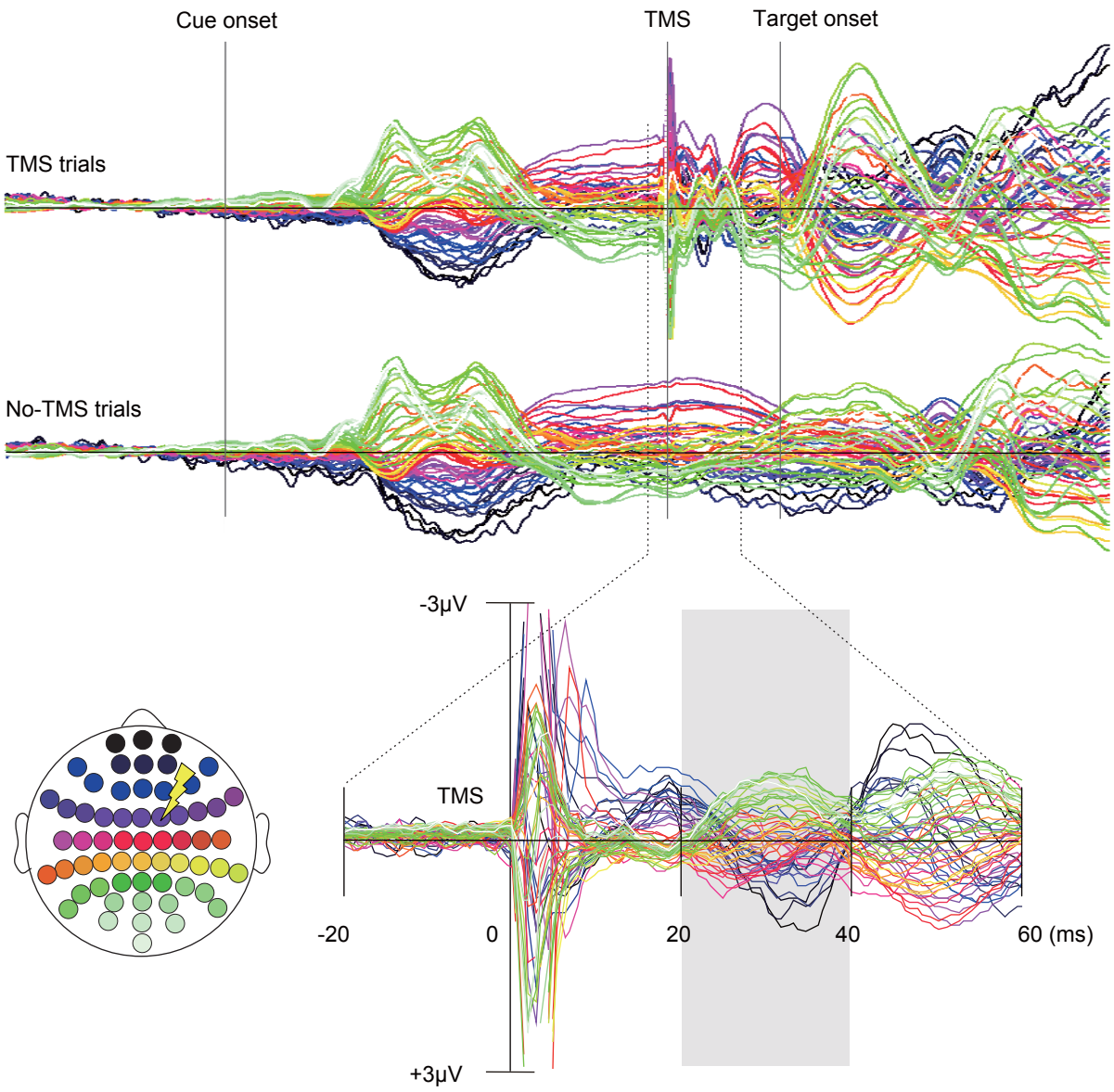


Supplemental Figure 1

EOG data for three representative subjects. Traces of EOG were averaged across trials for each of correct antisaccade (red), error antisaccade (green), and correct prosaccade (cyan) and also for each of the three levels of target eccentricity. Note that on most of error antisaccade trials, erroneous reflexive saccade to a visual target is immediately followed by corrective antisaccade.



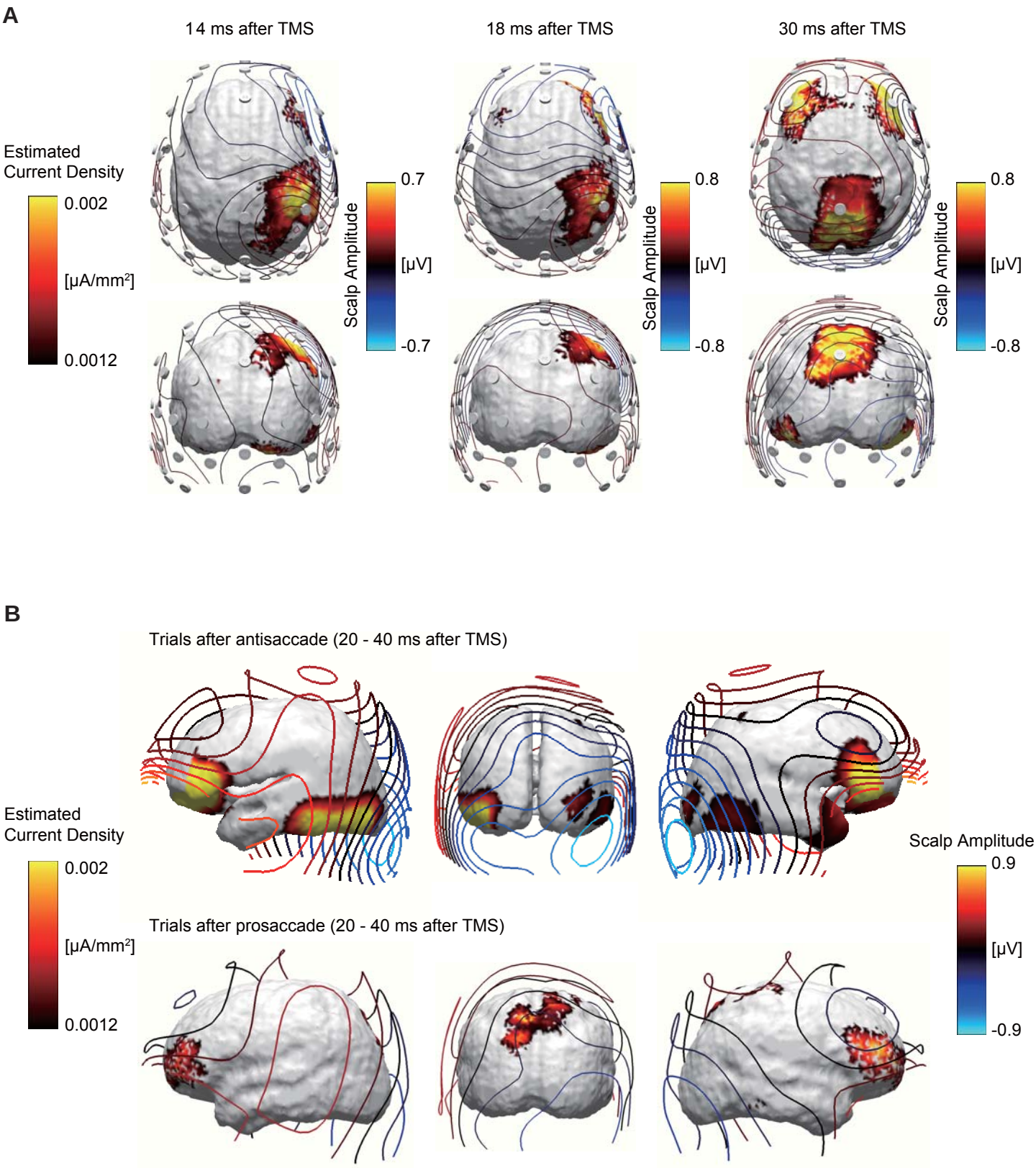
Supplemental Figure 2

Butterfly plots of EEG on TMS and no-TMS trials

Upper and middle plots show waveforms recorded on TMS trials and no-TMS trials, respectively. EEGs are averaged across conditions and subjects, and are displayed from -200 to 800 ms of cue onset.

Bottom plot shows TMS-EPs, which are calculated by subtracting the waveforms on no-TMS trials from those on TMS trials, and are displayed from -20 to 60 ms of TMS.

Colors of the waveforms correspond to the electrode positions on the scalp, indicated by the inset at lower left. A yellow symbol of lightening bolt in the inset indicates scalp position at which TMS was applied.

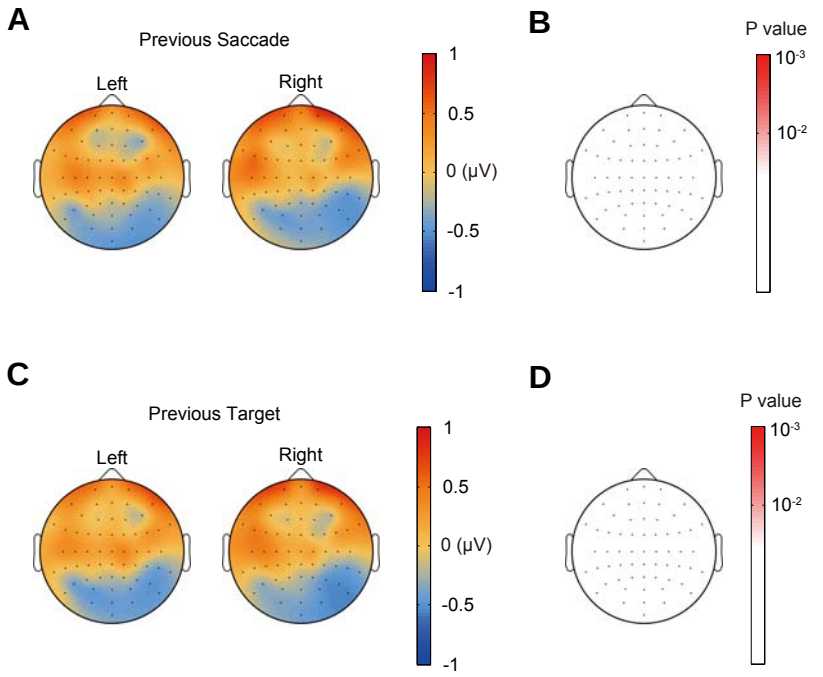


Supplemental Figure 3

Cortical sources of TMS-EPs.

A, Time course of current source density map. Current sources for TMS-EPs on all trials are estimated at 14, 18 and 30 ms after TMS and are rendered onto the surface of the MNI template brain. Estimated current density is color-coded according to the color bar on the left. Scalp voltage amplitudes are shown by isoelectric contour lines according to the color bar on the right.

B, Current source density maps for TMS-EPs during 20 – 40 ms after TMS are shown separately for trials after antisaccade and for trials after prosaccade.



Supplemental Figure 4

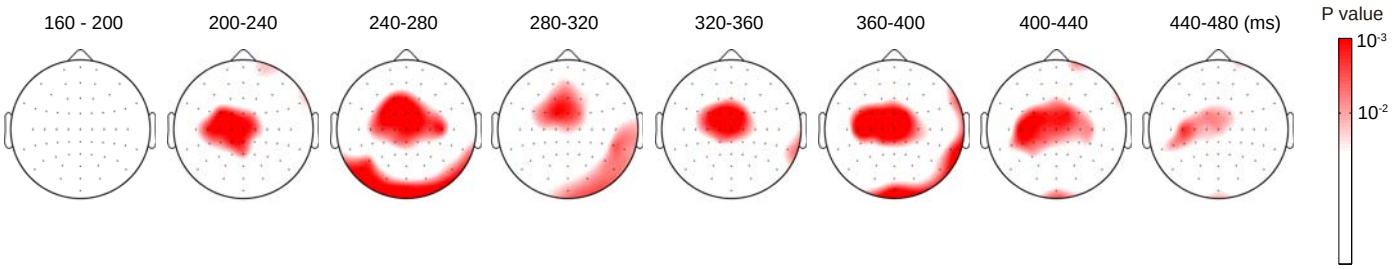
Effect of previous saccade direction and target direction onTMS-EPs

A, Scalp topography of TMS-EPs amplitude within the time window of 20-40 ms after TMS, separately shown for previous saccade direction.

B, Scalp topography of P-values based on direct comparison between previous saccade directions.

C, Scalp topography of TMS-EPs amplitude within the time window of 20-40 ms after TMS, separately shown for previous target direction.

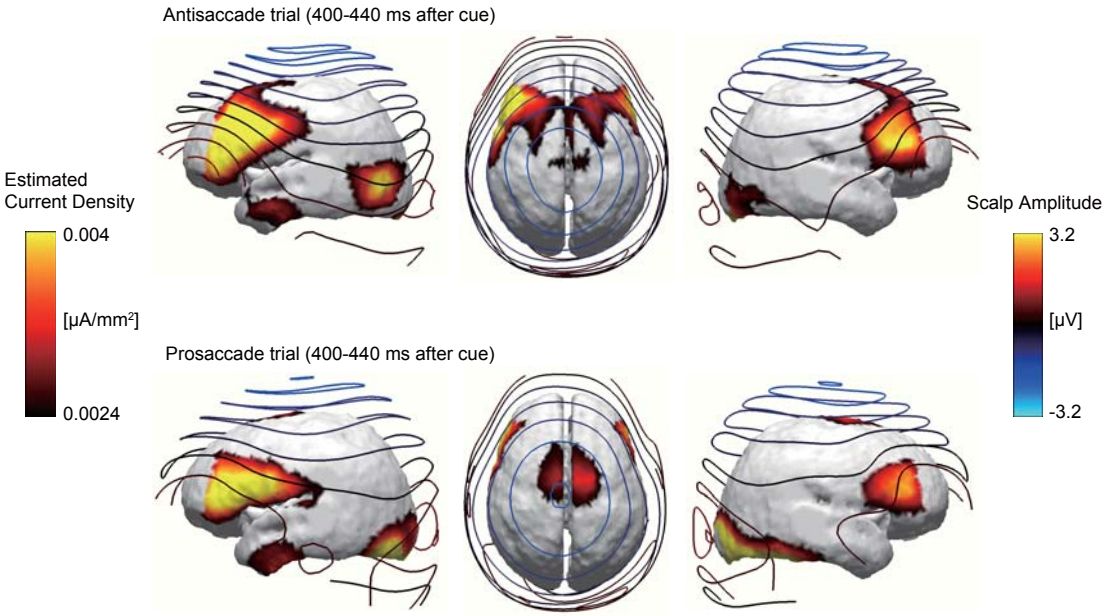
D, Scalp topography of P-values based on direct comparison between previous target directions.



Supplemental Figure 5

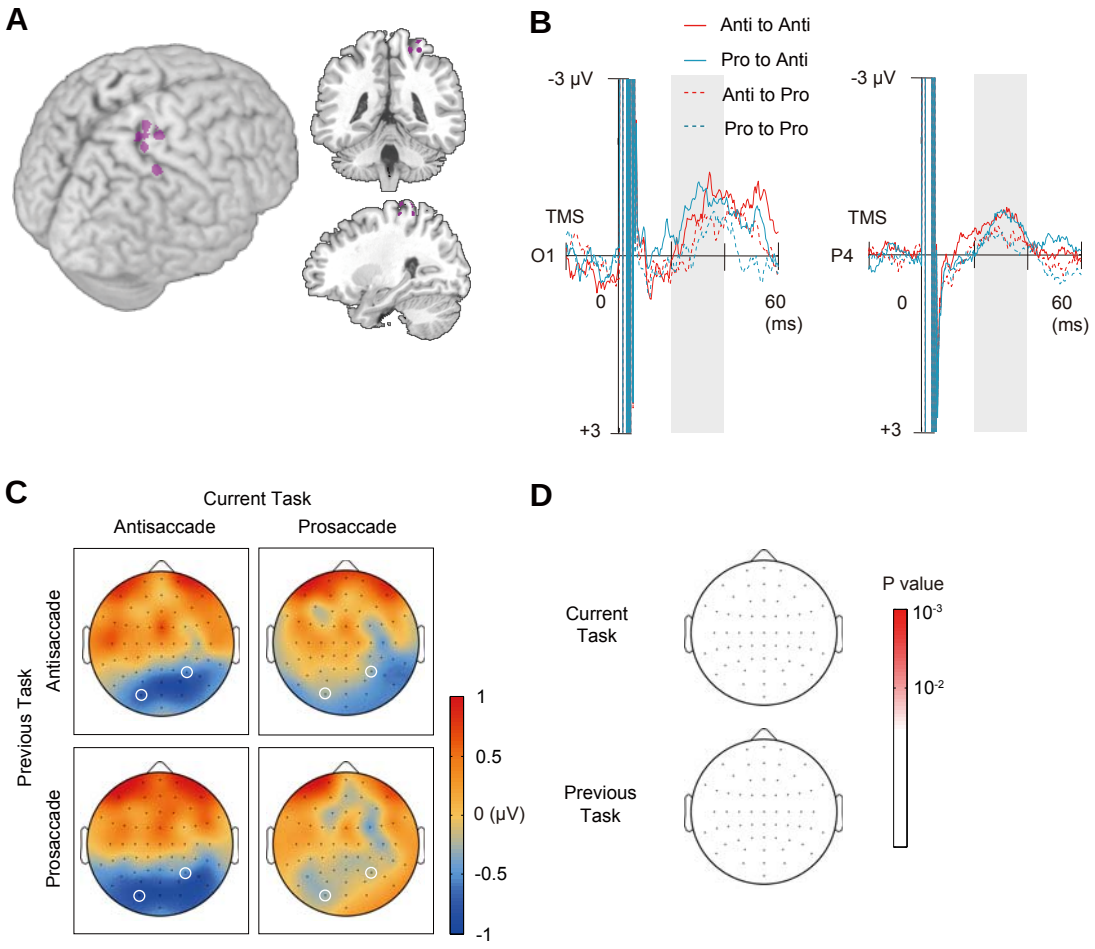
Time course of differential ERPs between antisaccade and prosaccade trials. P-values based on paired t-test between antisaccade and prosaccade trials are calculated for each electrode position at each time window of 40 ms during 160 and 480 ms after the cue onset. P-values were linearly interpolated across electrode positions and color-coded according to the color bar on the right.

Supplemental Figure 5 (Akaishi et al.)



Supplemental Figure 6

Cortical sources of ERPs. Current source density map for the ERPs during 400 – 440 ms after the onset of a task-instructing cue is shown separately for antisaccade and prosaccade trials. Scalp voltage amplitudes are shown by isoelectric contour lines.



Supplemental Figure 7

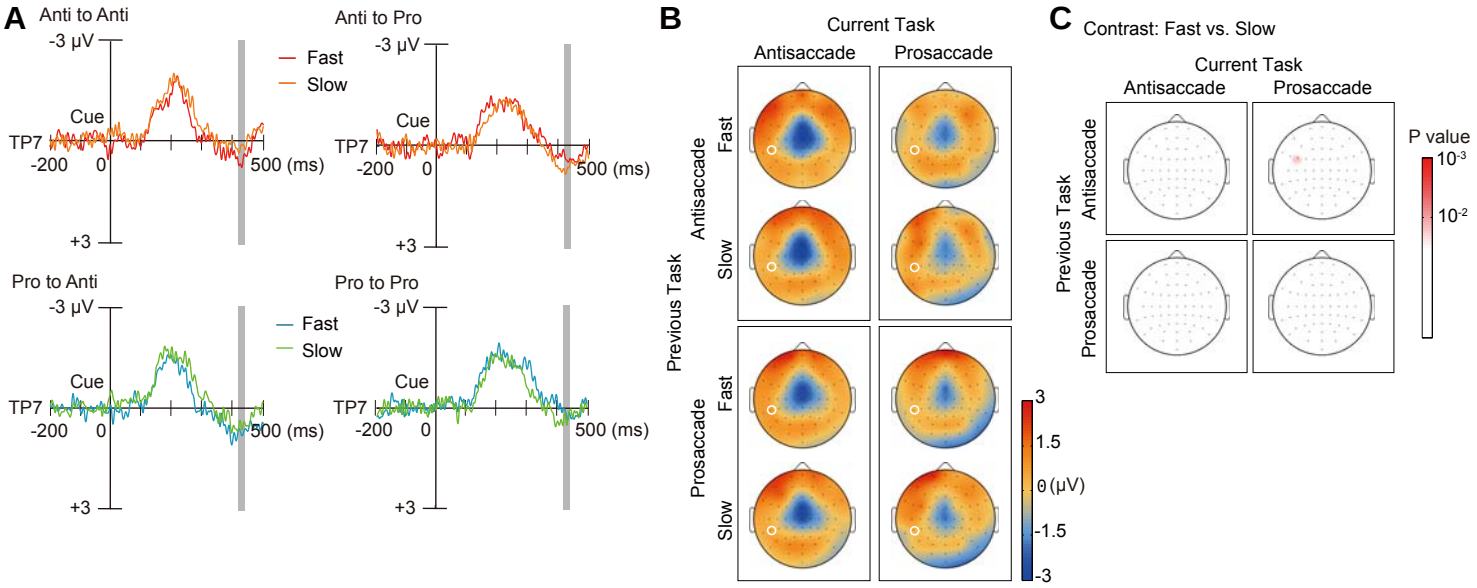
TMS-EPs induced by control site stimulation

(A) Position of the control TMS rendered on 3D surface of MNI template brain (left), coronal section at y = -42 (upper right), and sagittal section at x = 28 (lower right).

(B) TMS-EPs at electrode O1 and P4 (marked with white circle in **C**), separately shown for the four conditions based on the previous and current tasks.

(C) Scalp topography of TMS-EPs amplitude within the time window of 20-40 ms after TMS (gray shading in **B**), separately shown for previous task (rows) and current task (columns).

(D) Scalp topography of P-values based on two-way ANOVA with factors of current task (upper) and previous task (lower).



Supplemental Figure 8

ERPs are not associated with saccade latency.

A, ERPs on fast and slow response trials at electrode TP7 (marked with white circle in **B**) are shown separately for the four conditions based on the previous and current tasks. ERPs at this electrode did not differ between fast and slow response trials for all conditions, whereas as shown in **Figure 3**, TMS-EPs at the same electrode differed significantly between fast and slow response trials after antisaccade.

B, Scalp topography of ERPs amplitude within the time window of 20 - 40 ms after TMS (gray shading in **A**). In each cell defined by the previous task (rows) and current task (columns), maps are shown separately for fast (upper) and slow (lower) response trials.

C, Scalp topography of P-values based on paired t-test. ERPs at each electrode position were compared between fast and slow response trials. Results are shown separately for the types of previous task (rows) and types of current task (columns).