**Saccade TAG definition:**

**Tag-1: prim\_success**

Onset should be around 1.5° of target\_start

Offset should be around 1.5° of target\_cue

Visual was based on the moment the target\_start jumped to target\_cue. For the neural data, the photodiode\_signal was used for alignment.

Auditory was same moment of time as Visual. But for the neural data, the state\_signal was used for alignment.

The neural data were aligned based on the state\_signal, except for the visual.

**Tag-2: prim\_attempt**

Onset should be around 1.5° of target\_start

Offset was not around target\_cue, however, the saccade was made in the correct direction. In other words, the difference in saccade trajectory angle should be less than 45° of target\_jump angle.

Visual was based on the moment the target\_start jumped to target\_cue. For the neural data, the photodiode\_signal was used for alignment.

Auditory was same moment of time as Visual. But for the neural data, the state\_signal was used for alignment.

The neural data were aligned based on the state\_signal, except for the visual.

**Tag-3: prim\_fail**

Onset should be around 1.5° of target\_start

Offset was not around target\_cue, and also the saccade was **not** made in the correct direction. In other words, the difference in saccade trajectory angle was more than 45° of target\_jump angle.

Visual was based on the moment the target\_start jumped to target\_cue. For the neural data, the photodiode\_signal was used for alignment.

Auditory was same moment of time as Visual. But for the neural data, the state\_signal was used for alignment.

The neural data were aligned based on the state\_signal, except for the visual.

**Tag-4: corr\_success**

Should happen after a “tag-1: prim\_success” saccade.

Onset should be around 1.5° of proceeding prim\_success offset.

Offset should be around 1.5° of target\_end

Visual was based on the proceeding prim\_success offset.

Auditory was based on the proceeding prim\_success offset.

The neural data were aligned based on the state\_signal.

**Tag-5: corr\_fail**

Should happen after a “tag-1: prim\_success” saccade.

Onset should be around 1.5° of proceeding prim\_success offset.

Offset was not around 1.5° of target\_end

Visual was based on the proceeding prim\_success offset.

Auditory was based on the proceeding prim\_success offset.

The neural data were aligned based on the state\_signal.

**Tag-6: back\_center\_success**

Should be the first saccade that was made in the trial.

Onset had no condition.

Offset should be around 1.5° of target\_start

Visual was based on the trial start time.

Auditory was not assigned, i.e., NaN.

The neural data were aligned based on the state\_signal.

**Tag-7: back\_center\_prim**

Should happen after a primary or corrective saccade. In other words, the proceeding saccade should be any of the tag-1 to tag-5.

Onset should be around 1.5° of proceeding prim/corr offset.

Offset should be around 1.5° of target\_start

Visual was based on the moment that target jumped to target\_start position. For the neural data, the photodiode\_signal was used for alignment.

Auditory was based on the proceeding prim/corr offset. The state\_signal was used for neural data alignment

The neural data were aligned based on the state\_signal, except for the visual.

**Tag-8: back\_center\_irrelev**

The proceeding saccade was **not** one of tag-1 to tag-5. This saccade was **not** the first saccade of the trial. This saccade was the one that satisfied the target\_start fixation criterion and subsequently triggered the start->cue target jump. A target jump exceeds this type of saccade.

Onset had no condition.

Offset should be around 1.5° of target\_start

Visual was based on the proceeding saccade offset.

Auditory was not assigned, i.e., NaN.

The neural data were aligned based on the state\_signal.

**Tag-9: target\_irrelev**

These are the saccades that were made toward the target but did not trigger a target jump during the trial. Many of these saccades are back-to-center saccades that were not followed but enough fixation to trigger the start->cue target jump. Some of these saccade were made toward target\_end after a corr\_fail saccade.

Onset had no condition.

Offset should be around 1.5° of target

Visual was based on the proceeding saccade offset.

Auditory was not assigned, i.e., NaN.

The neural data were aligned based on the state\_signal.

**Tag-10: other\_irrelev**

These are the remaining saccades that were not part of any of the previous tags. These saccades were mainly made during harvesting the reward. There saccades were made toward a blank area of the screen.

Onset had no condition.

Offset should **not** be around 1.5° of target.

Visual was based on the proceeding saccade offset.

Auditory was not assigned, i.e., NaN.

The neural data were aligned based on the state\_signal.