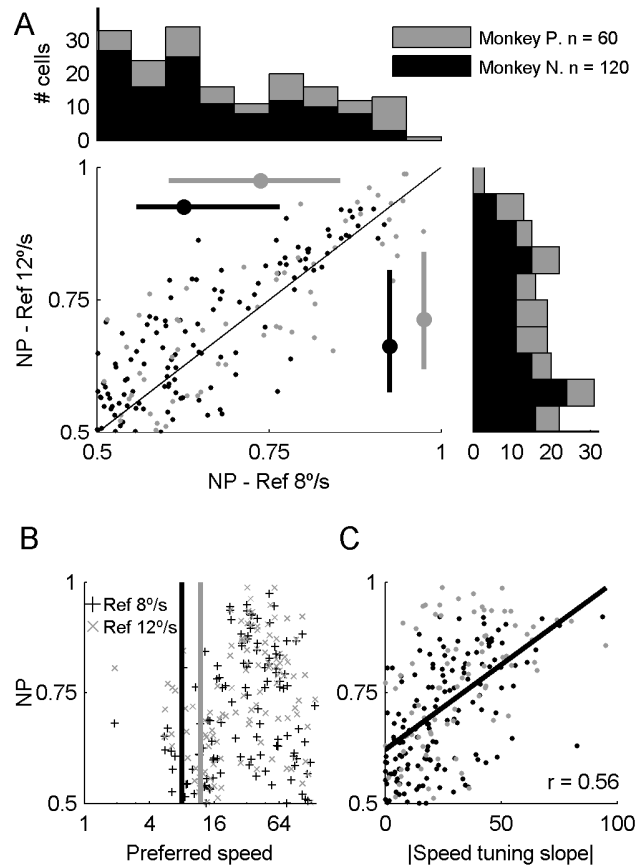


## Supplementary Information (5 figures)

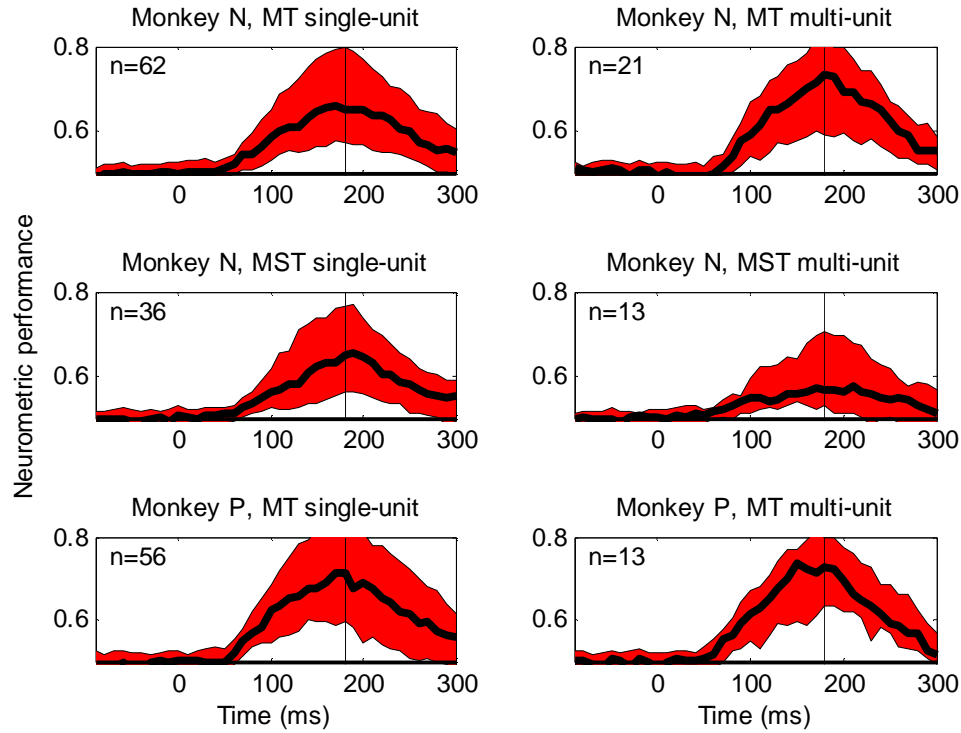
Title: Timescales of sensory- and decision-related activity in MT and MST

Authors: Nicholas SC Price & Richard T Born



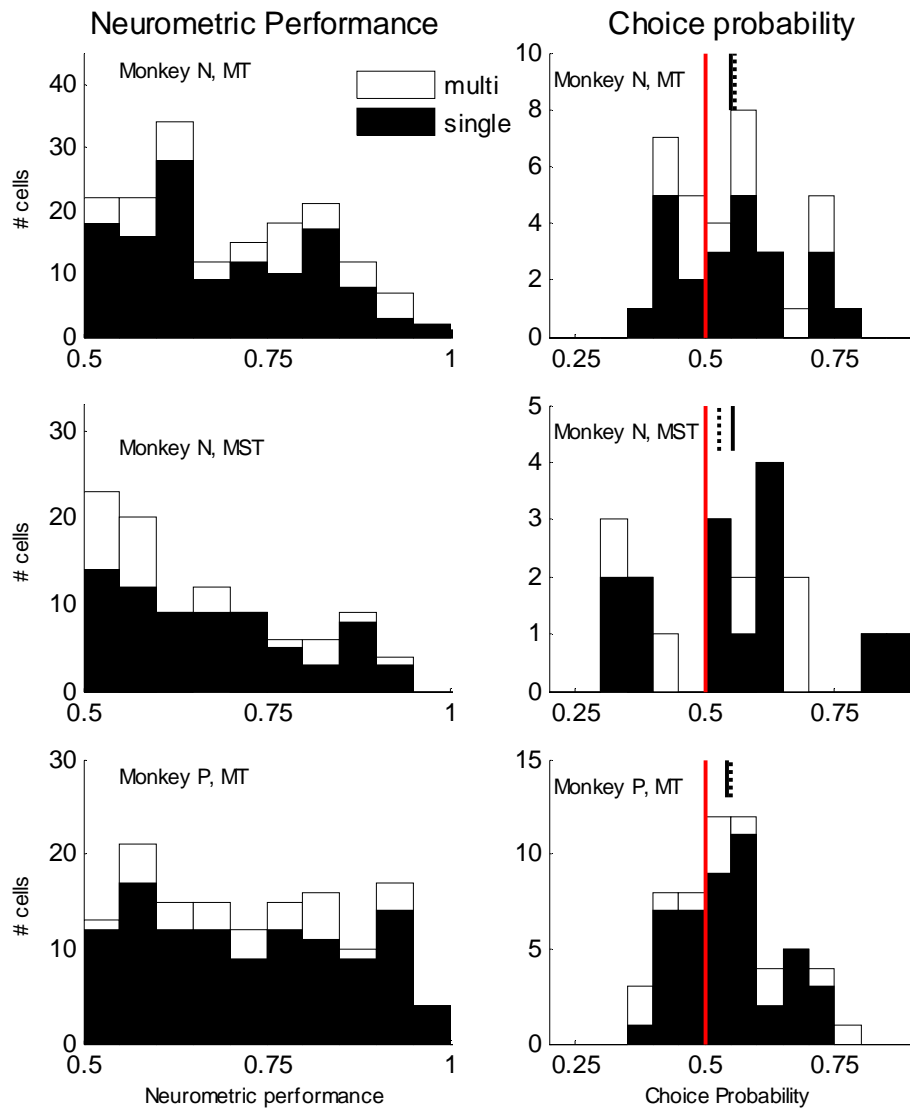
## Supplementary Figure 1

Population summary of neurometric performance. A. Scatter plot and marginal histograms of NP for reference speeds of 8 and 12°/s. NP measured independently with each reference speed was correlated ( $r=0.88$ ,  $p<0.01$ ). Thick lines and circles in the scatter plot indicate median $\pm$ quartiles. NP was not significantly correlated with a neuron's preferred speed (B,  $p=0.28$ ) but was strongly correlated with the absolute value of the speed tuning curve slope at the reference speed (C,  $r=0.56$ ,  $p<0.01$ ). Each neuron contributes two points to B and C, because of the two reference speeds.



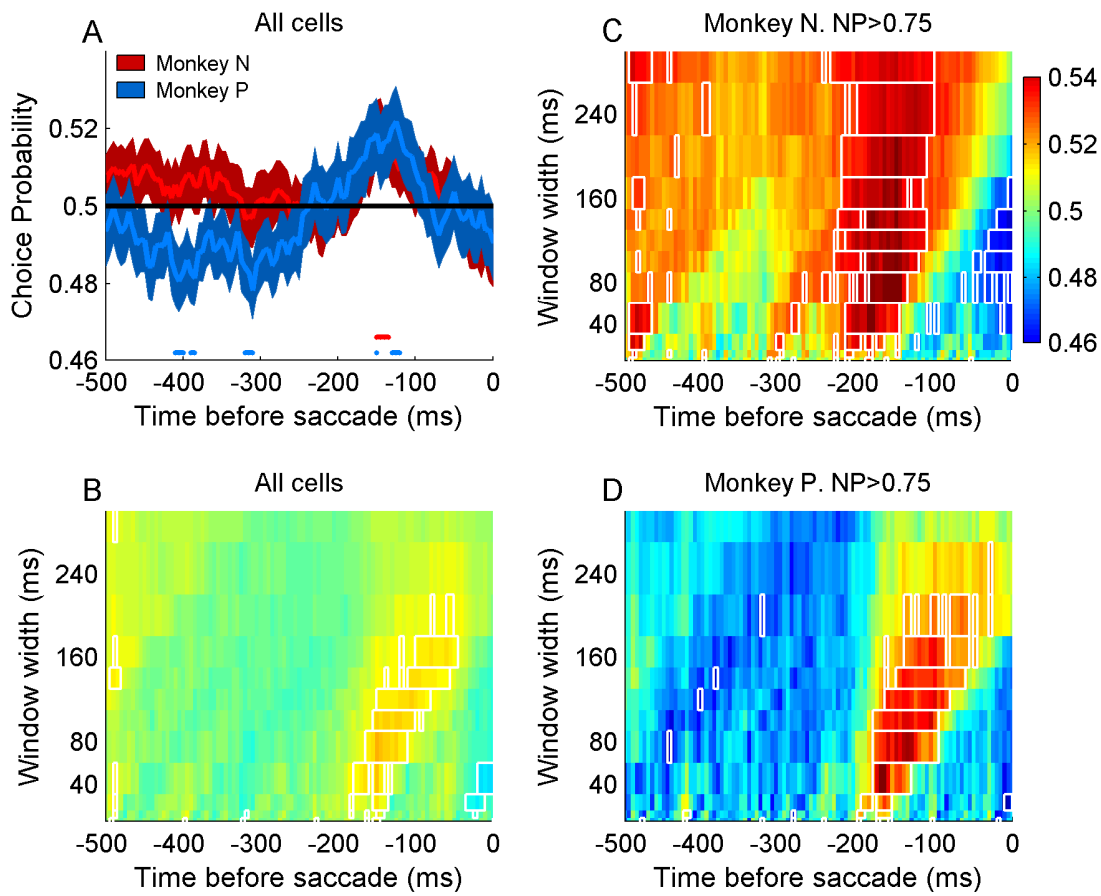
## Supplementary Figure 2.

Same conventions as Figure 3A. Temporal evolution of neurometric performance (median  $\pm$  quartiles) in a sliding time window of 120 ms width. For all neuronal groupings, peak NP occurs at a similar time (180 ms). Comparing distributions at 180 ms, medians were not significantly different between any of same-area, same-animal, different-isolation groups (i.e. Monkey N MT single- versus multi-unit). Further, only the Monkey N, MST, multi-unit group was significantly different (Wilcoxon rank-sum,  $p < 0.05$ ) from any of the other groupings at 180 ms, however, this had the smallest number of neurons, with mostly peripheral receptive fields and high preferred speeds.



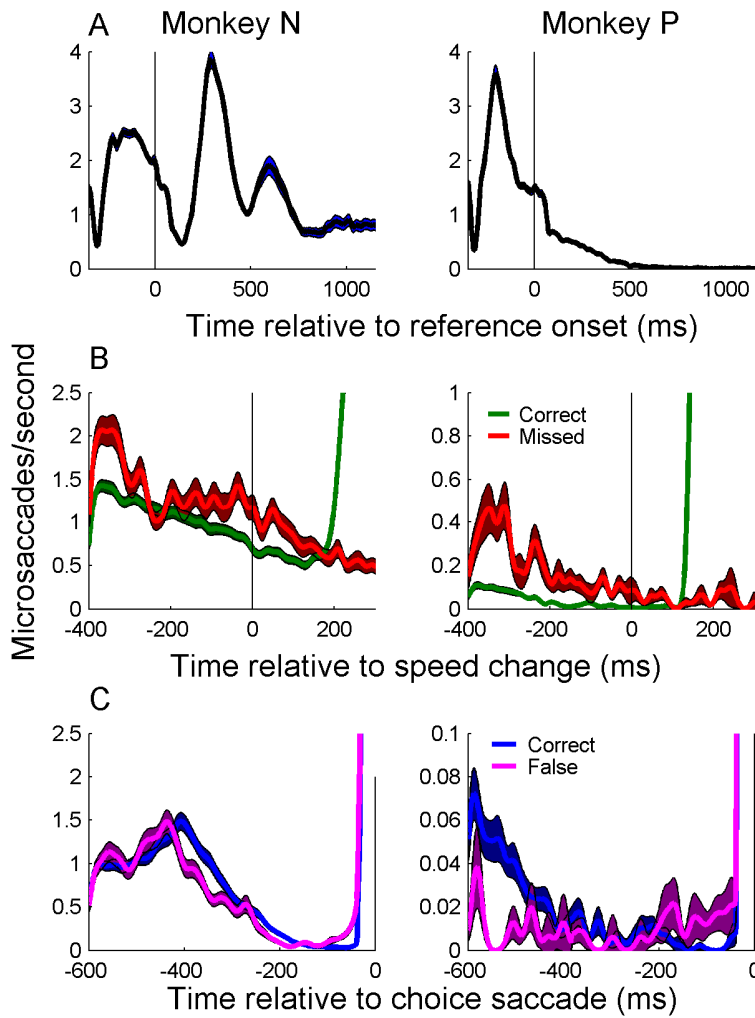
### Supplementary Figure 3.

Distributions of Neurometric Performance and Choice probability (for neurons with NP>0.75). No systematic differences are evident between animals, areas or isolation. Vertical black lines in the panels in the right column show the mean choice probability for the individual neuron groupings. These are significantly greater than 0.5 for Monkey N, MT single and multi-unit, and Monkey P, MT single unit (t-test,  $p<0.05$ ).



## Supplementary Figure 4

Temporal evolution of choice probability. (A) CP calculated in a sliding 80 ms window for all neurons, regardless of NP (compare with Figure 4C). Traces are aligned on the time of the choice saccade and show mean  $\pm$  SEM. Spots at bottom of panel indicate time windows in which CP was significantly different from 0.5 ( $p < 0.05$ ). (B) Mean CP across all neurons, regardless of NP, for window widths 5-300 ms. Mean CP across all neurons with NP > 0.75 are shown for Monkey N (C) and Monkey P (D). White boxes in B-D indicate time windows in which the mean CP is significantly different from chance (t-test,  $p < 0.05$ ).



### Supplementary Figure 5

Rate of microsaccades (mean  $\pm$  SEM) aligned on: (A) the time of reference motion onset for all trials; (B) the time of the speed change for correct detections versus misses; (C) the time of the choice saccade for correct versus false detections. For both animals, the microsaccade rate in the period from 100 ms before to 100 ms after the speed change was significantly higher on Missed trials vs Detect trials (B,  $p < 0.01$ ).