



**Title:** Neuronal discharges in the prefrontal cortex reflect changes in conscious perception during a no report binocular rivalry paradigm

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**Abstract:**

The phenomenon of binocular rivalry, which involves presentation of incongruent visual input to the two eyes, results in stochastic perceptual fluctuations between the two sensory signals. Given its ability to disentangle sensory input from conscious awareness, it has played an instrumental role in aiding critical insights about the neural correlates of conscious perception. Electrophysiological probing of various visual regions of primates engaged in binocular rivalry and related paradigms has revealed that the proportion of feature selective neurons whose spiking activity is correlated with ongoing perception increases as one progresses the visual cortical hierarchy, peaking in temporal and prefrontal cortices. However, recent theoretical and experimental approaches posit the use of no-report paradigms in order to disambiguate the functional role of prefrontal cortex in mediating task related behavior from that related to visual consciousness. To this end, we investigated the electrophysiological signals in the ventrolateral prefrontal cortex of monkeys, while they were presented with oppositely drifting sinusoidal gratings to the two eyes, thus inducing visual competition. The stimuli elicited an optokinetic nystagmus pattern which was utilized as an objective indicator of the subject's perceptual experience. We found that the visually selective neuronal discharges in the prefrontal cortex were robustly modulated in accordance with the animal's conscious perception. Importantly, the strength of this perceptual modulation was similar to the spiking activity elicited, when monocular stimulation was carried out. Put together, our results indicate that during a no report binocular rivalry paradigm, the spiking activity in the prefrontal cortex reflects subjective visual perception.