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Title: Multiplexing of conscious perception and unconscious stimuli in macaque face patches without report

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Abstract: A powerful paradigm to identify neural correlates of consciousness is binocular rivalry, wherein a constant visual stimulus evokes a varying conscious percept. It has recently been suggested that activity modulations observed during rivalry may represent the act of report rather than the conscious percept itself. Here, we performed high-channel single-unit recordings from face patches in macaque inferotemporal (IT) cortex using a novel no-report paradigm in which the animal's conscious percept was inferred from eye movements. We found that large proportions of IT neurons represented the conscious percept even without active report. However, even on single trials, modulation to rivalrous stimuli was weaker than that to unambiguous stimuli, suggesting that cells may encode not only the conscious percept but also the suppressed stimulus. To test this hypothesis, we varied the identity of the suppressed stimulus during rivalry. We found that we could decode both the conscious percept and the suppressed stimulus from neural activity. Together, our findings indicate that (1) IT cortex possesses a true neural correlate of consciousness, and (2) this correlate consists of a population code wherein single cells multiplex representation of the conscious percept and veridical physical stimulus, rather than a subset of cells perfectly reflecting consciousness.