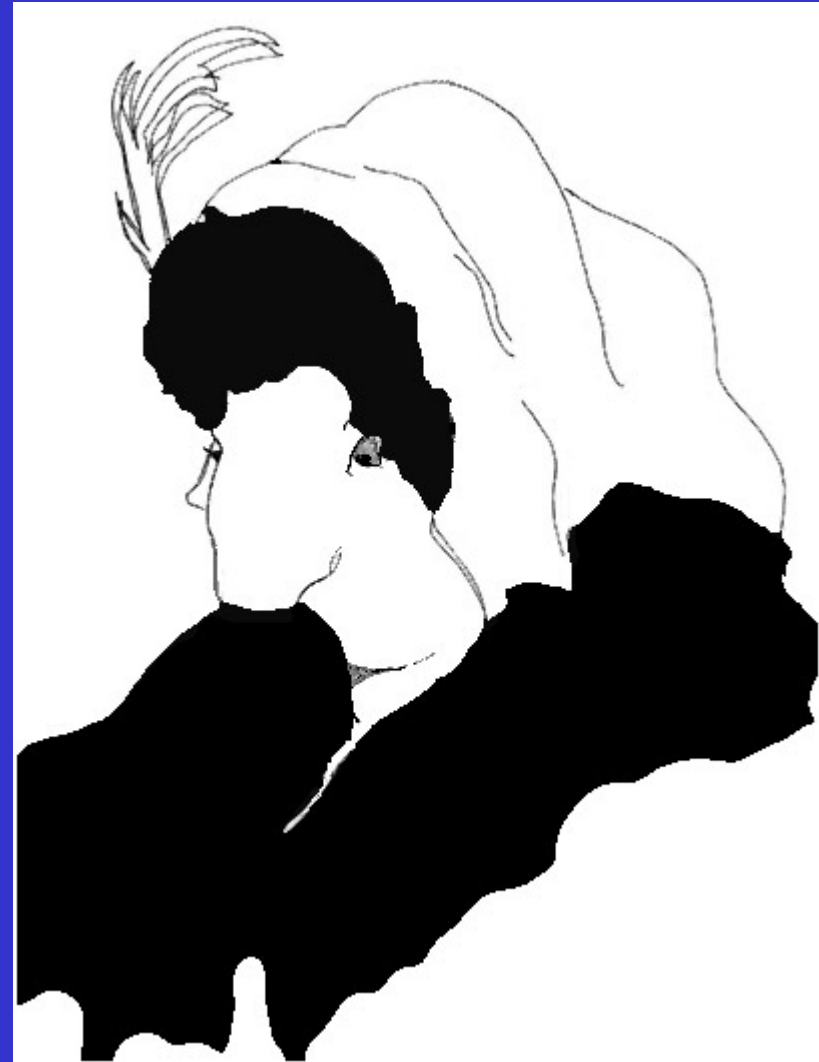
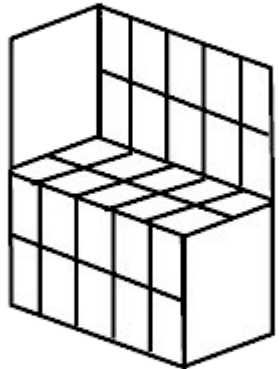
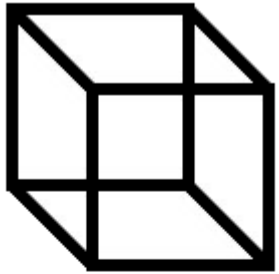


The quest for consciousness

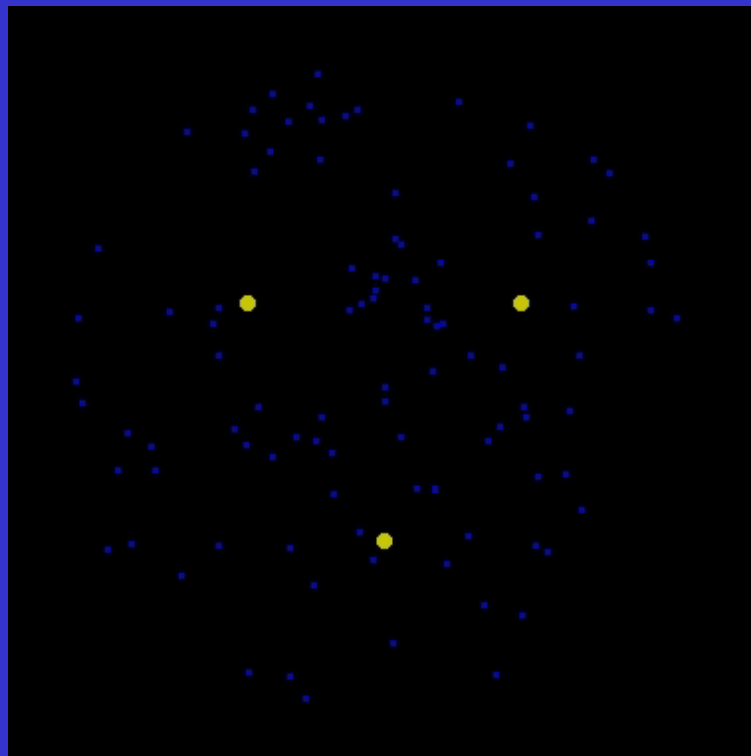
An experimental approach to the study of consciousness

- Bistable Percepts
- Binocular Rivalry
- Flash Suppression
- fMRI evidence
- Tracking neurons

Bistable percepts



Motion Induced Blindness



Binocular Rivalry



Perception alternates during binocular rivalry



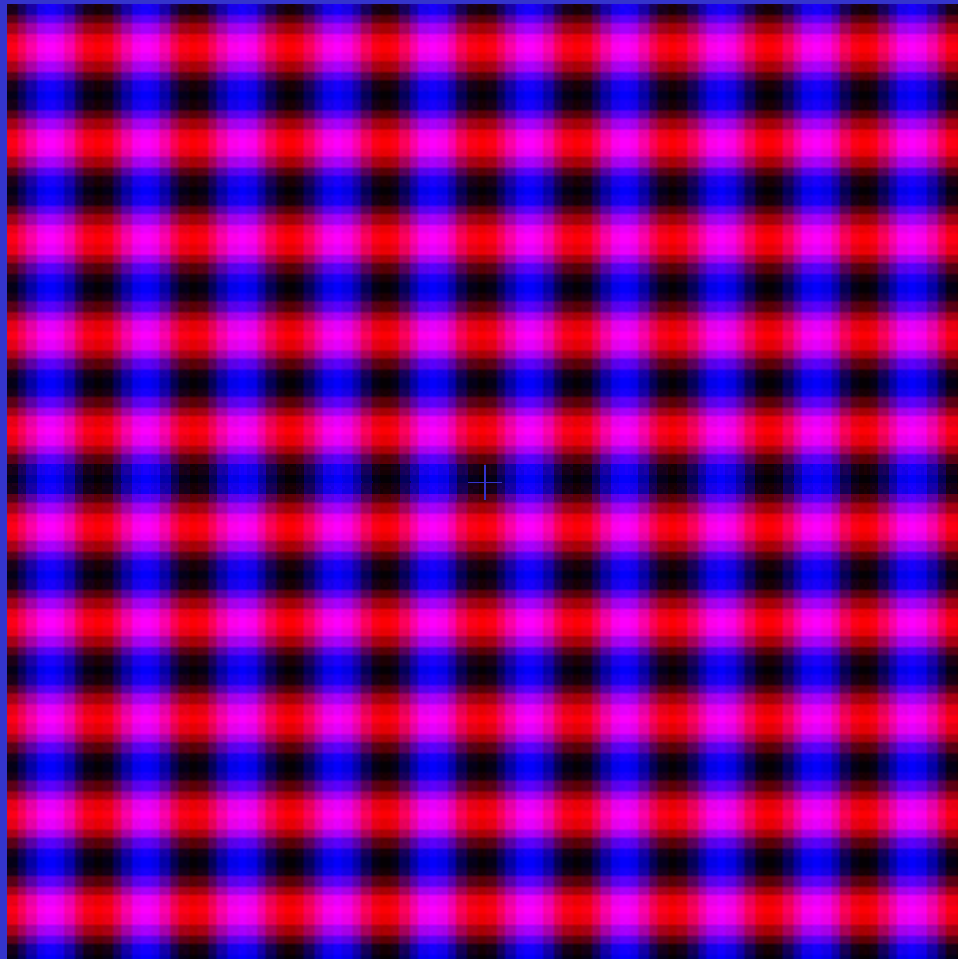
Right
eye



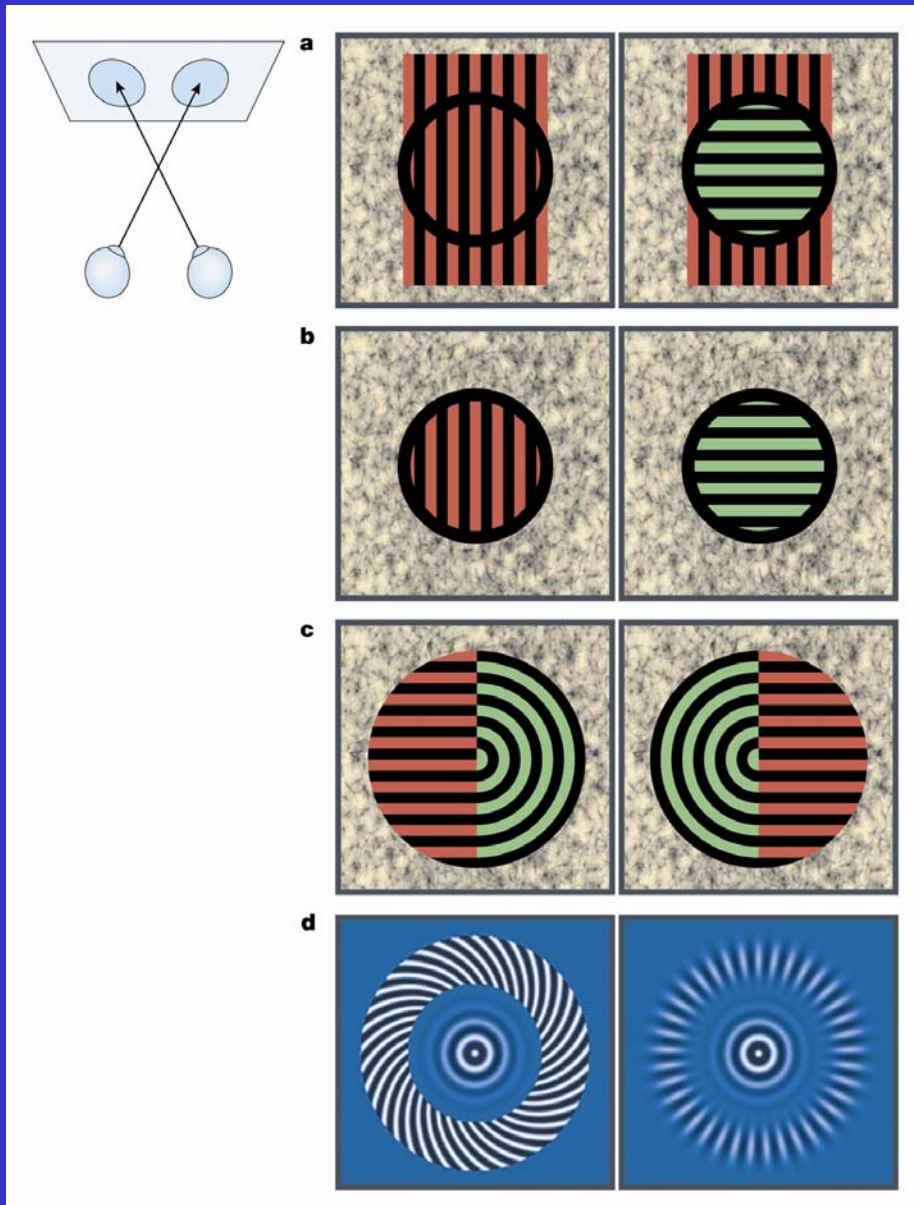
Left
eye

perception



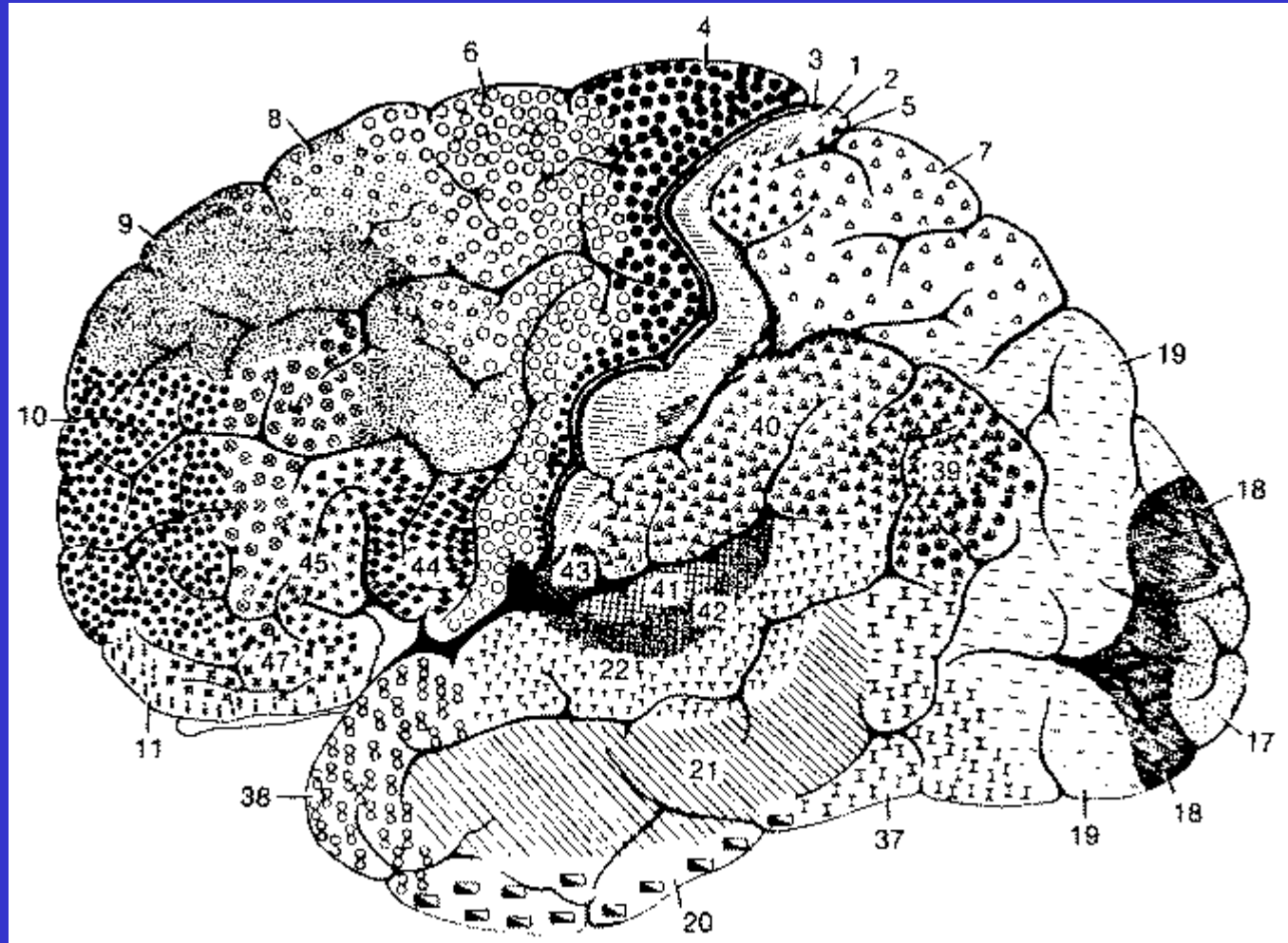


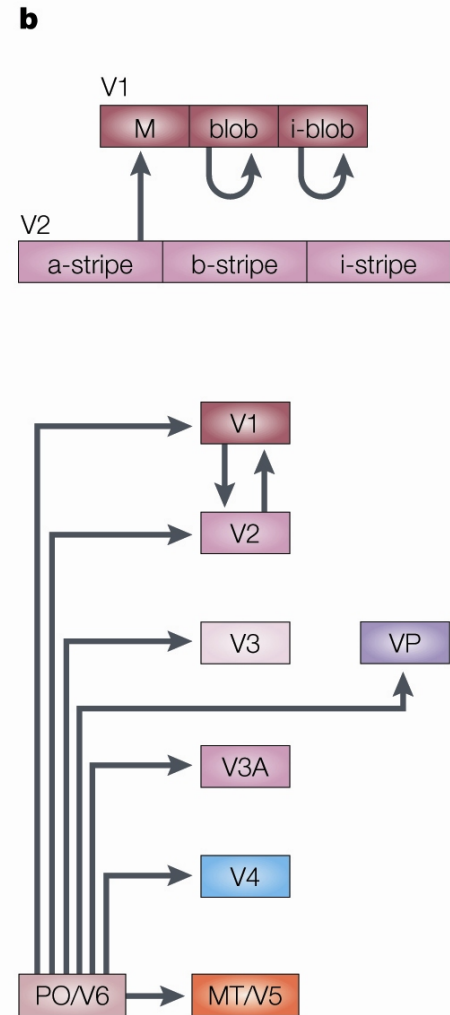
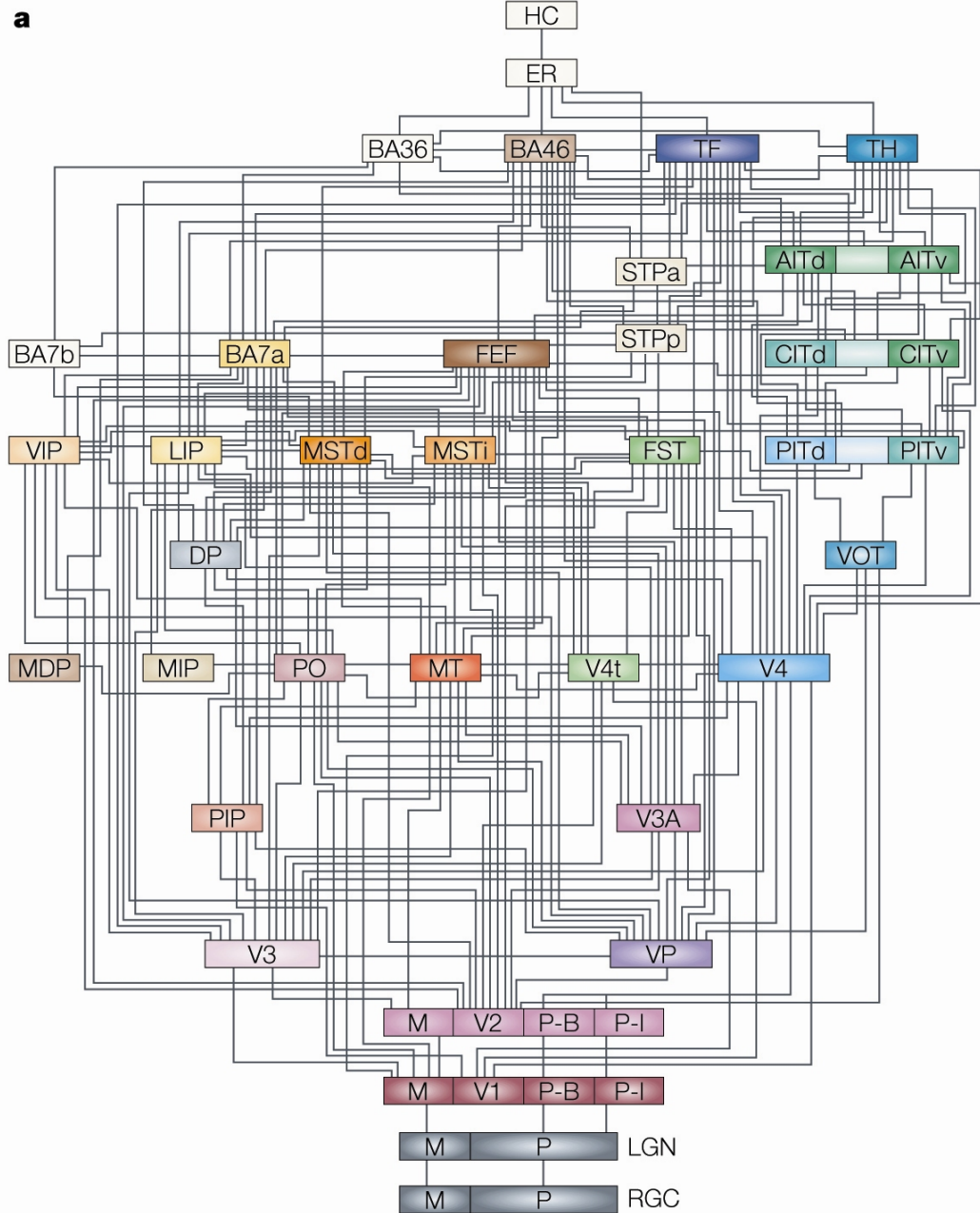




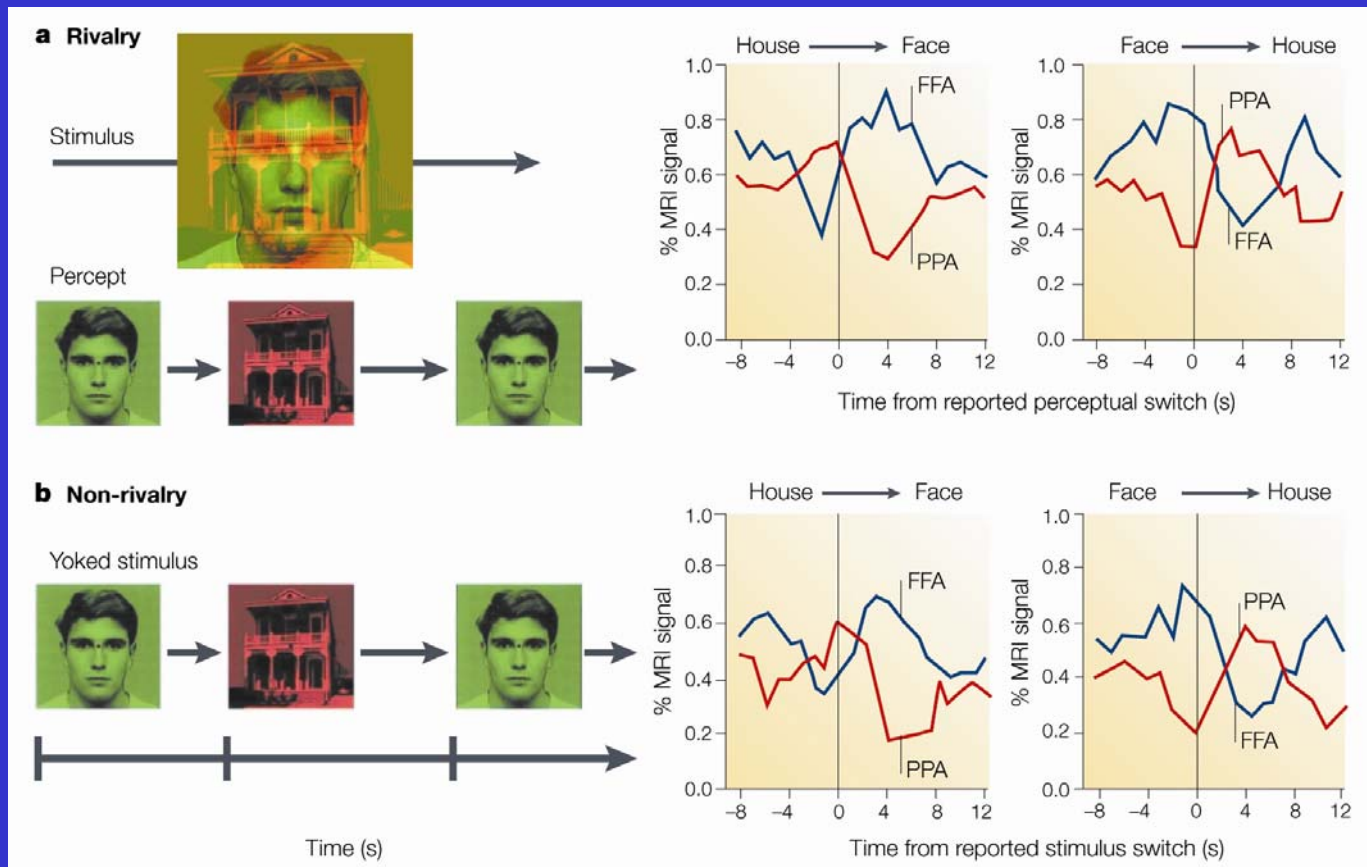
Blake, R. and N. Logothetis (2002). "Visual competition." Nature Reviews Neuroscience **3**: 13-21.

A little bit of anatomy

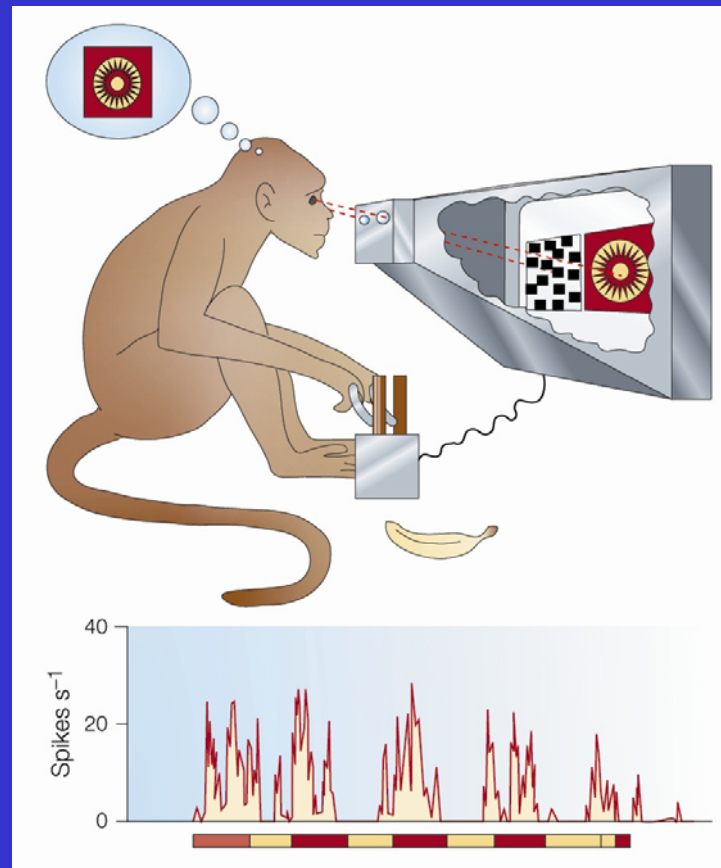


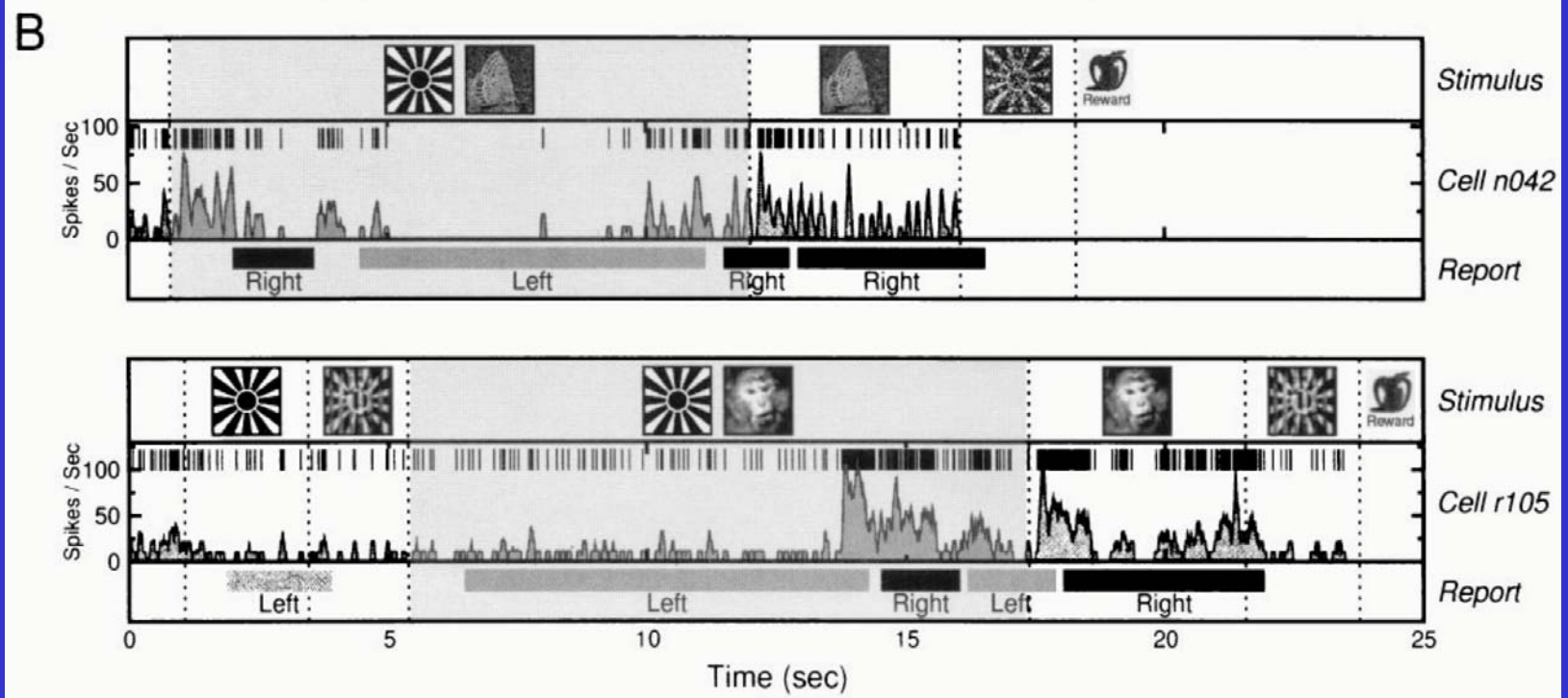
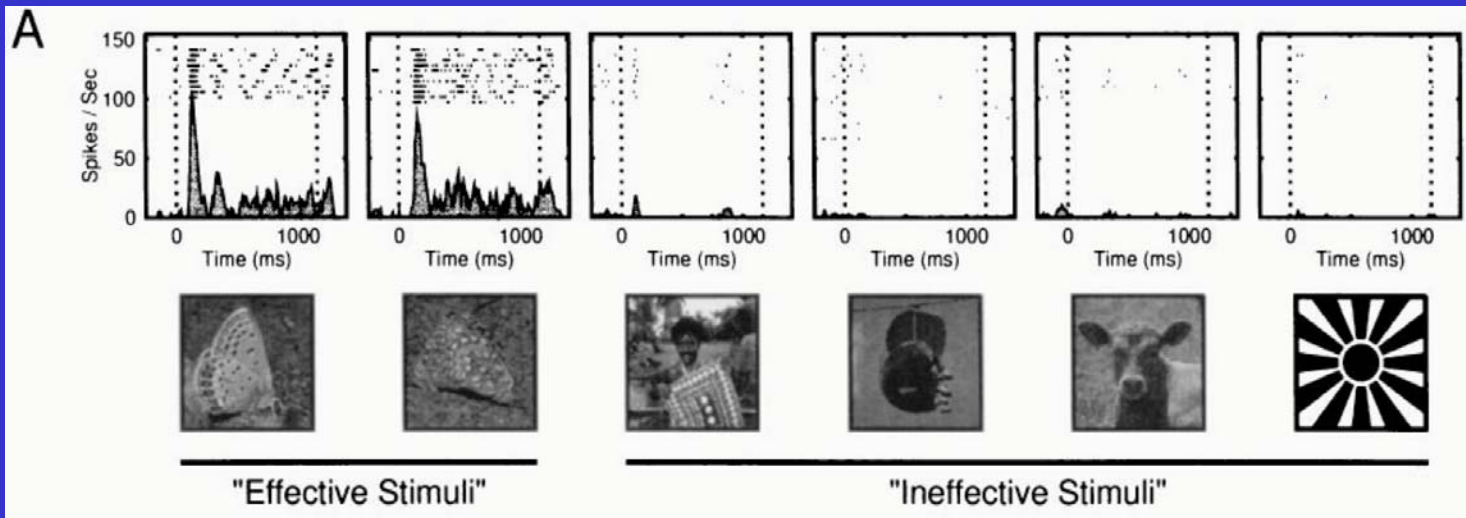


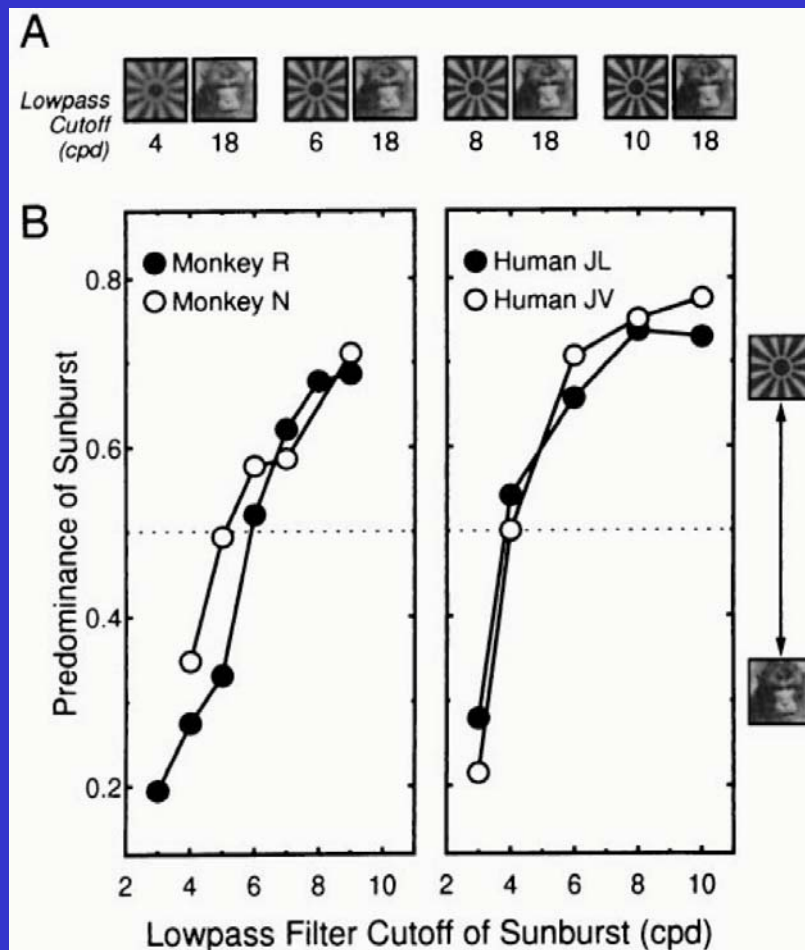
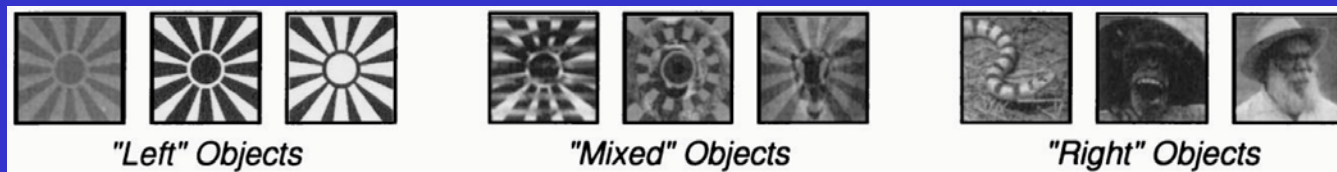
fMRI investigations



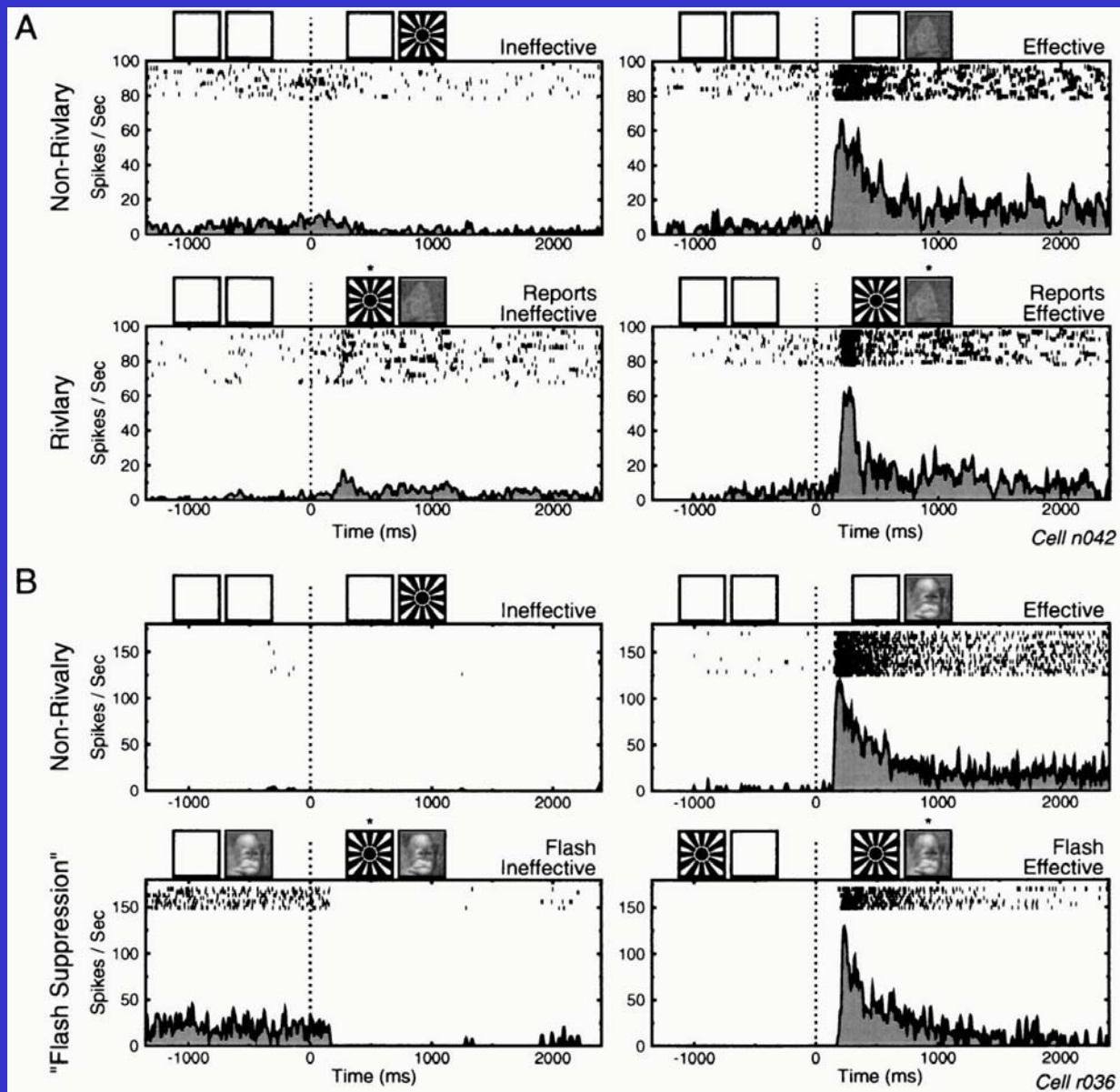
Following the activity of individual neurons

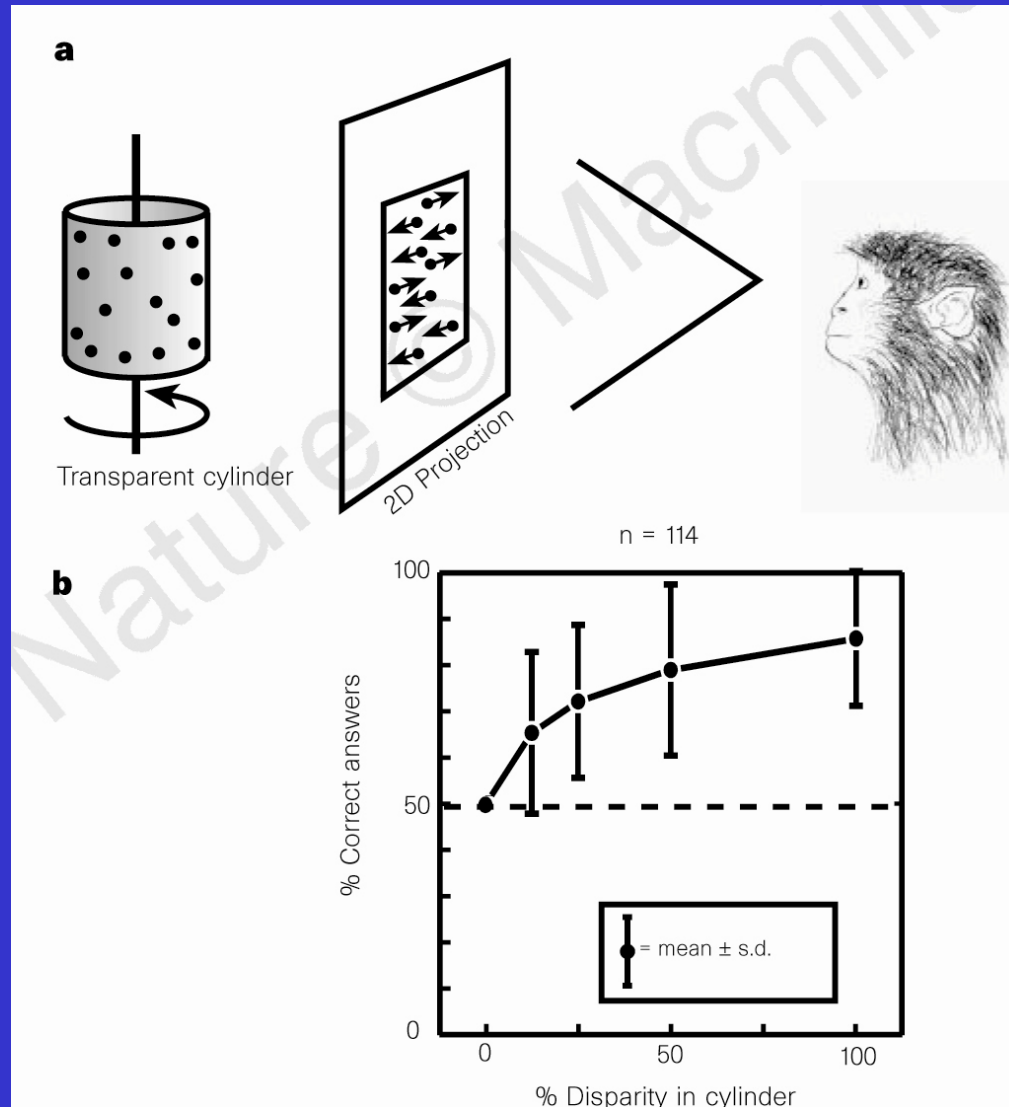




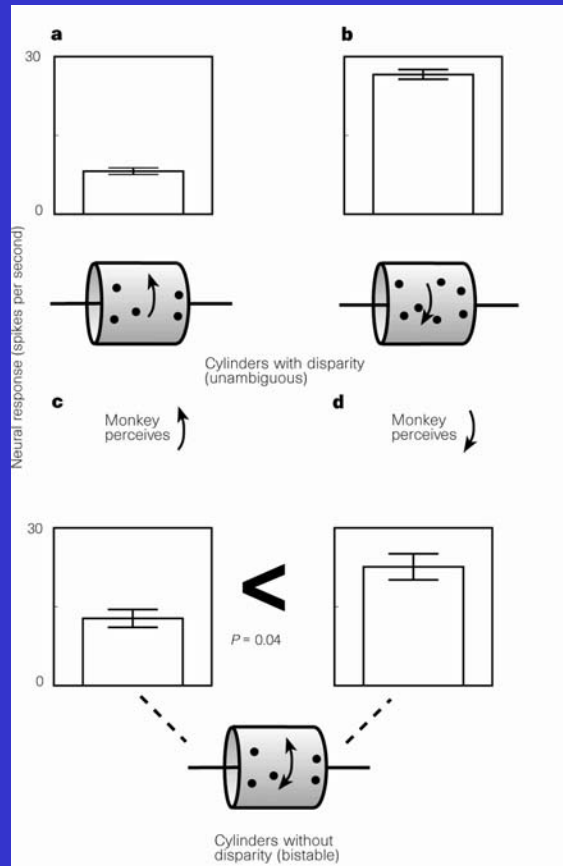


Sheinberg, D. L. and N. K. Logothetis (1997). "The role of temporal areas in perceptual organization." *Proceedings of the National Academy of Sciences, USA* **94**: 3408-3413.



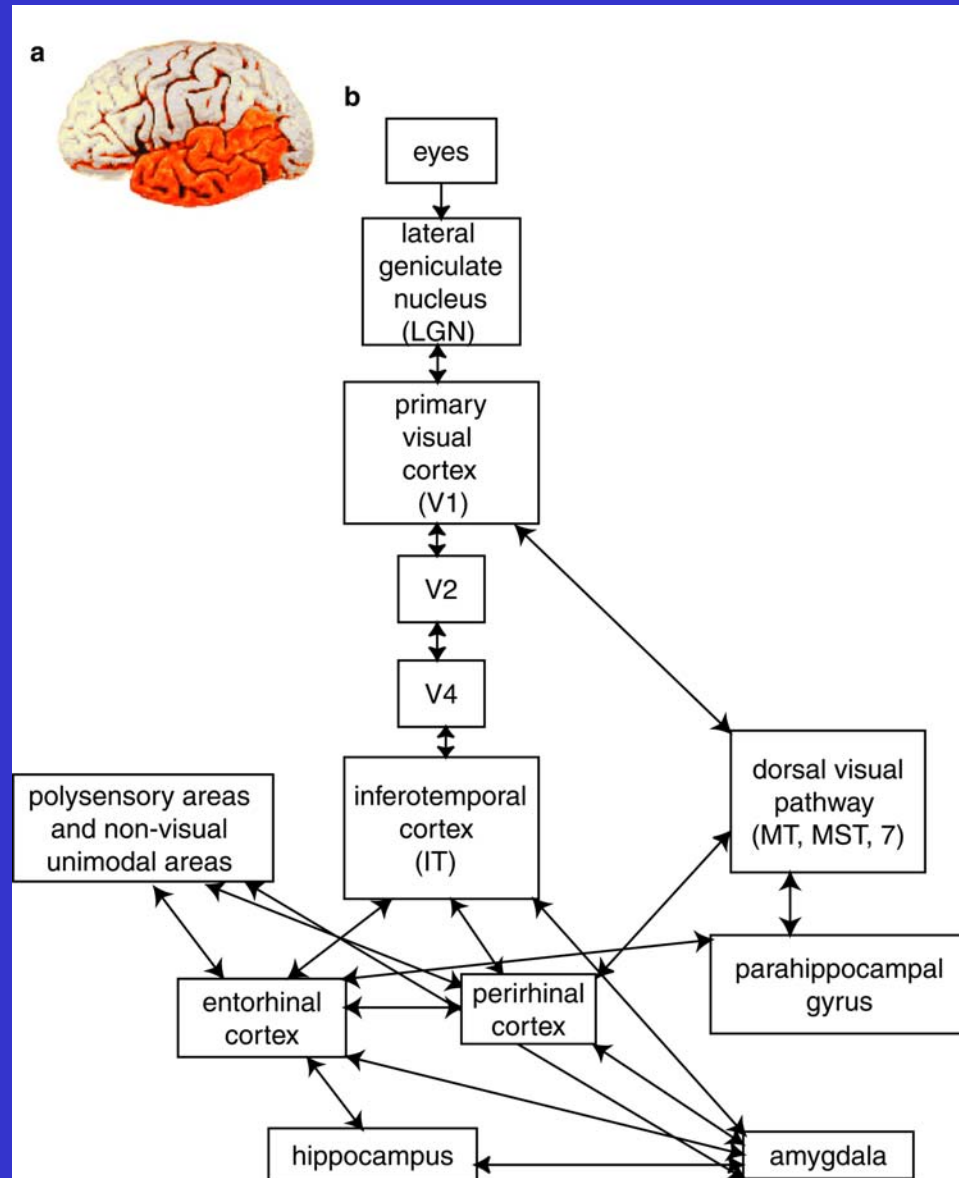


Bradley, D. C., G. C. Chang, et al. (1998). "Encoding of 3D structure from motion by primate area MT neurons." *Nature* **392**: 714-717.



Bradley, D. C., G. C. Chang, et al. (1998). "Encoding of 3D structure from motion by primate area MT neurons." *Nature* **392**: 714-717.

Schematic anatomy, human medial temporal lobe



- Far from the retinae
- High interconnectivity
- Multimodal

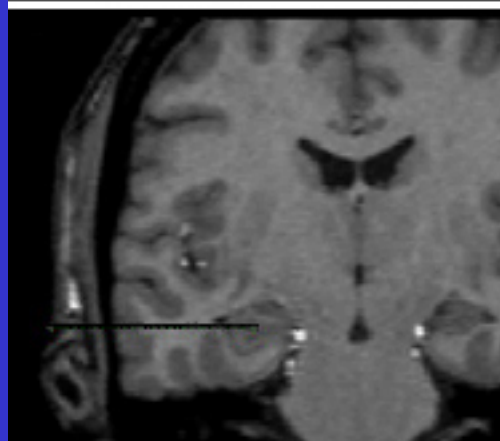
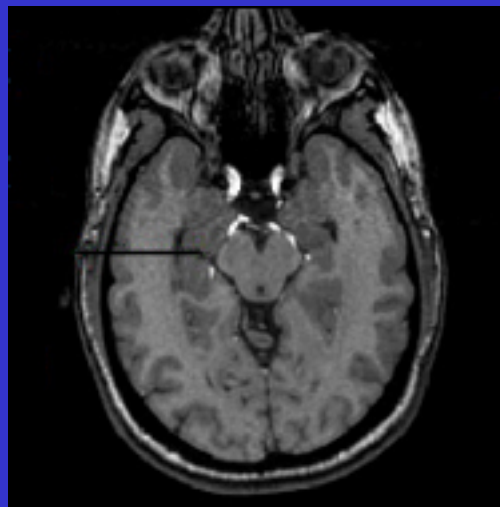
Single neuron recordings in epileptic patients

- Patients with pharmacologically intractable epilepsy

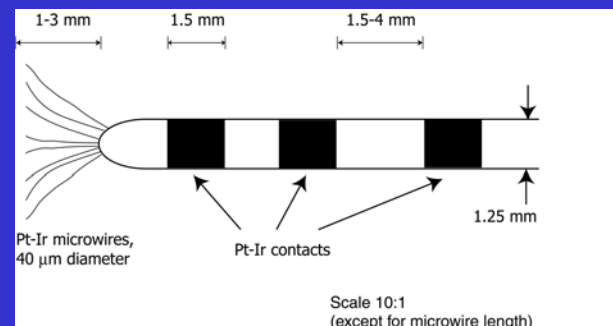
- Electrodes implanted to localize seizure focus

- Targets include the hippocampus, entorhinal cortex, amygdala and parahippocampal gyrus

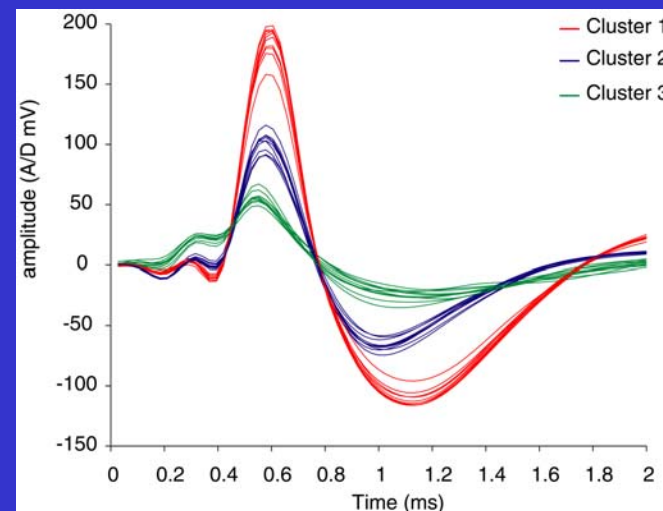
MRI



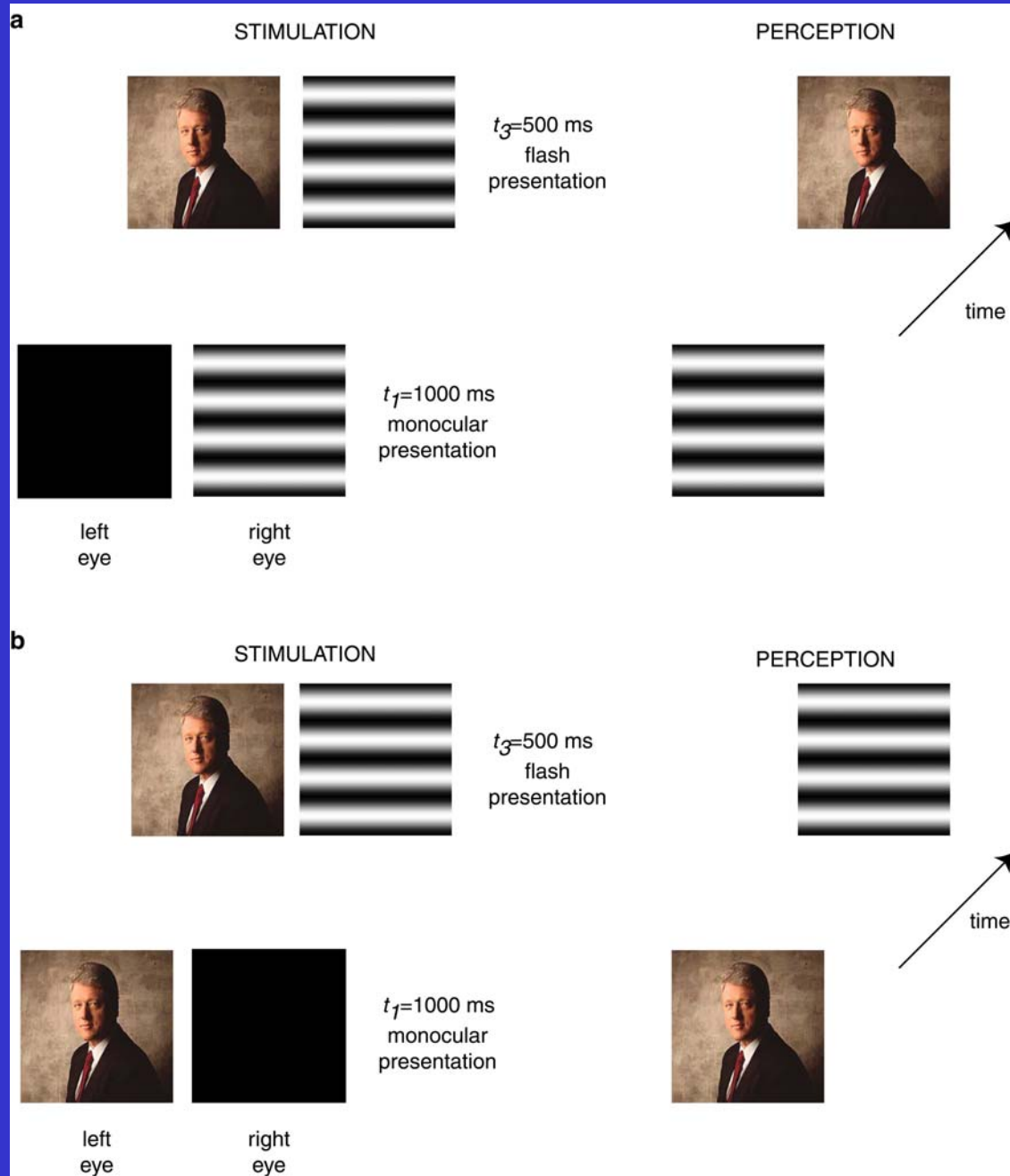
Electrodes

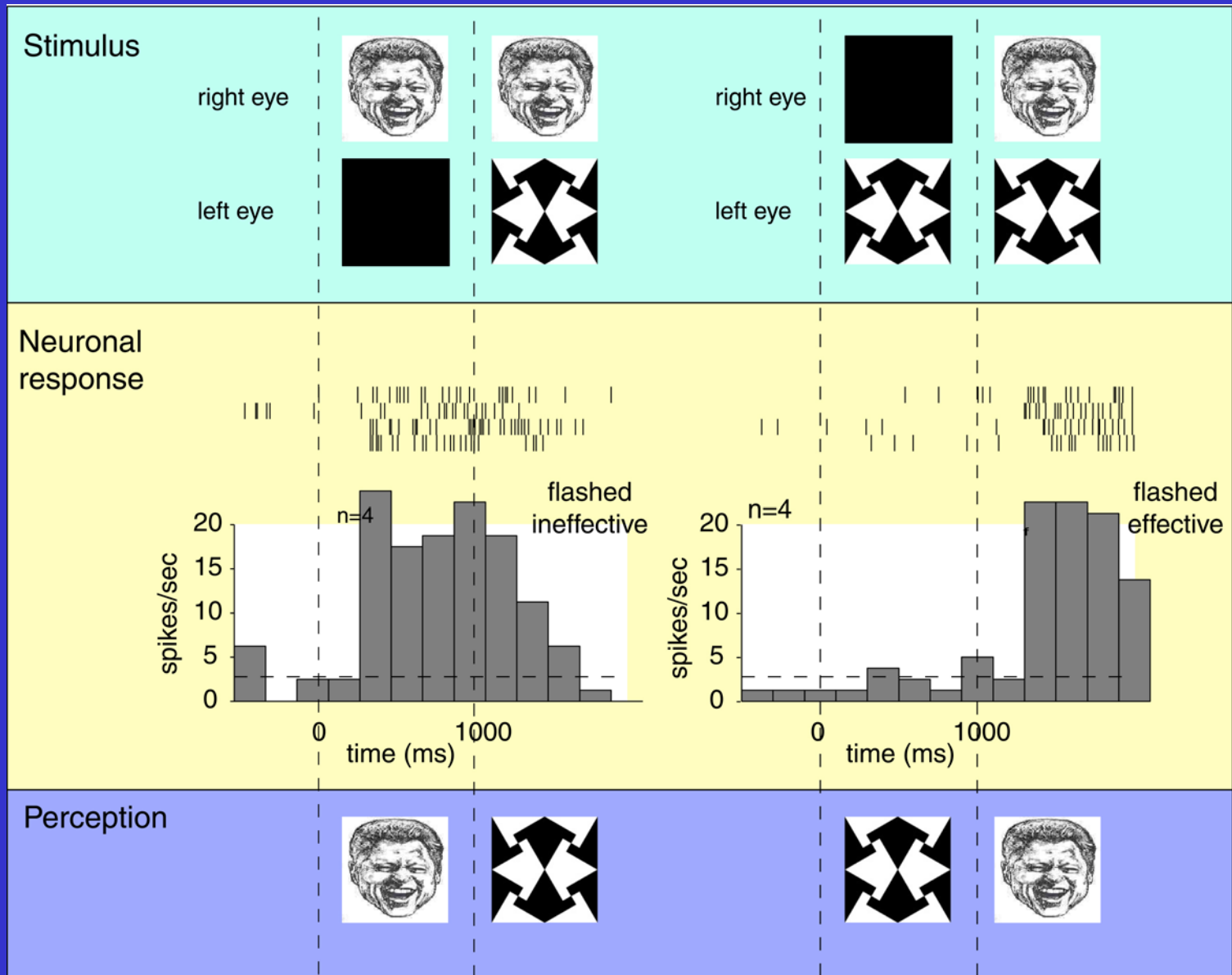


Spike sorting

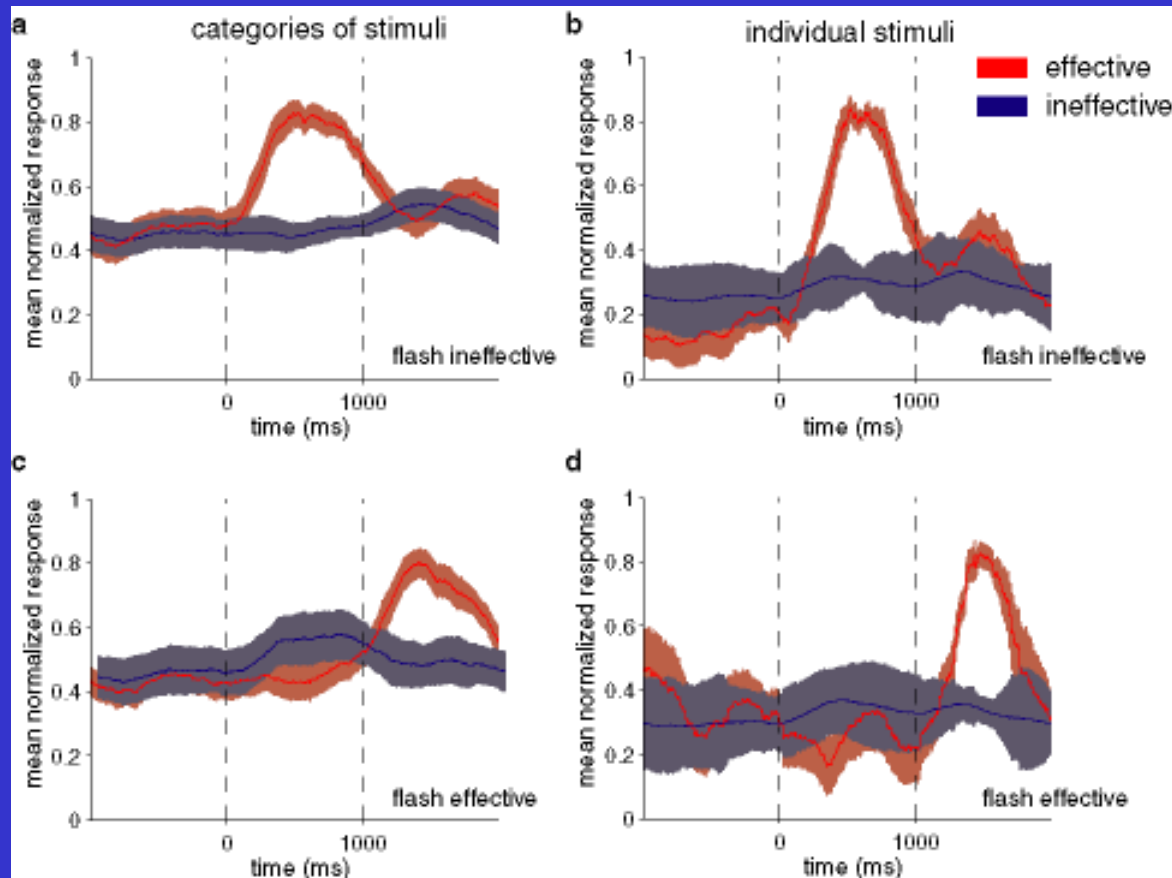


Flash suppression

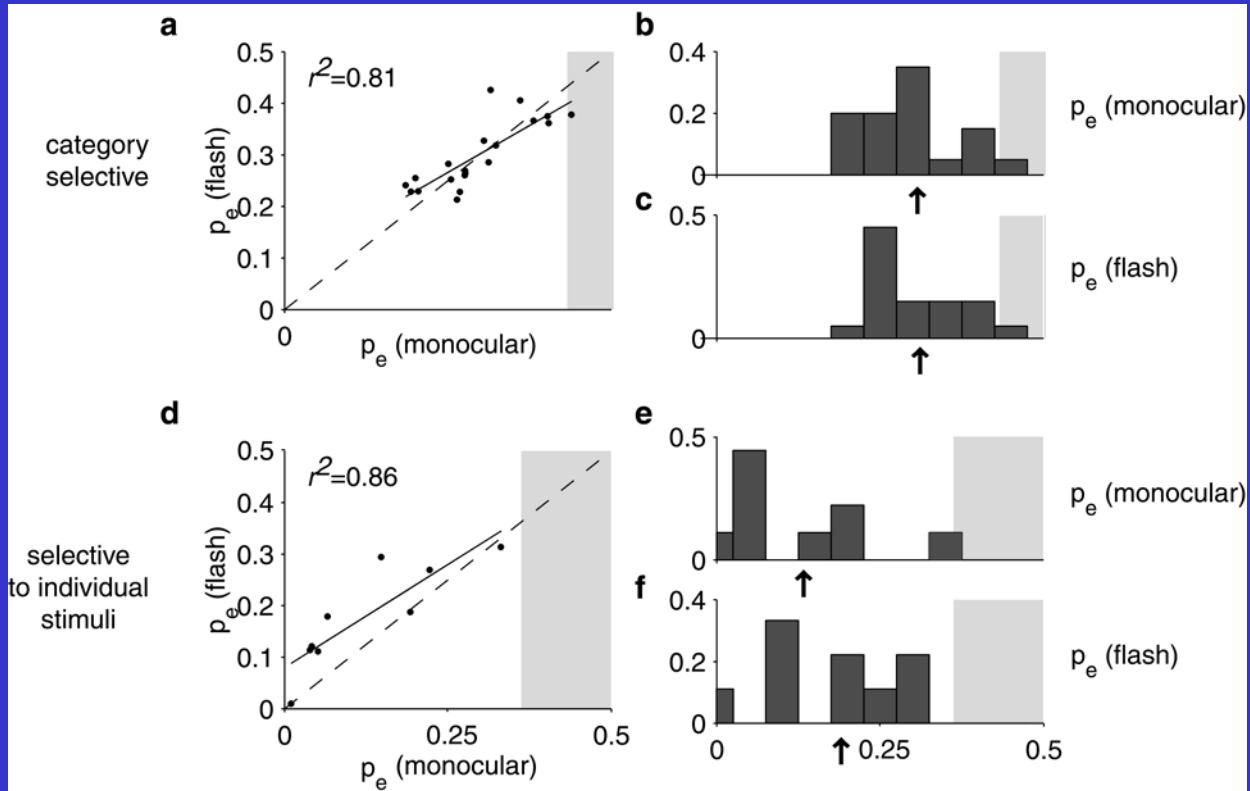




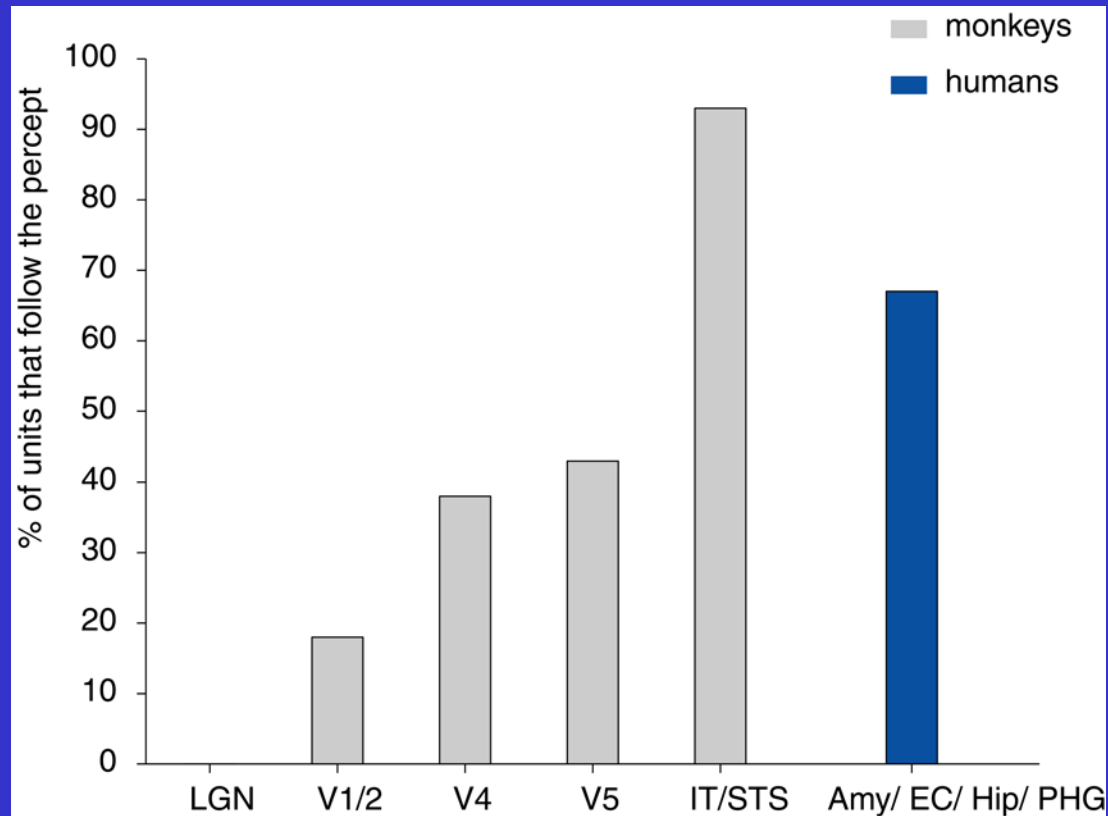
Flash suppression: summary of responses



No evidence for unconscious processing in the MTL



Comparison to data from monkeys



Summary

- Binocular Rivalry/Flash Suppression – “one-to-many” perceptual stimuli
 - Allow us to manipulate the percept
- Neuronal evidence from monkeys shows that neurons in early areas (LGN, V1) show little or no effect of the percept
- Neurons in later areas (IT, MTL) predominantly follow the percept
 - Candidates for the NCC?
- These studies showed correlations. What we will need in the future is causation.