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2005-09-06
Frank Tong. Primary Visual Cortex and Visual Awareness.

Executive Summary: An indecipherable mass of dry academic prose and neuroscience jargon. Damnit Jim, I'm a doctor, not a neuroscientist!

This paper summarized a range of studies covering visual phenomena, concentrating on the primary visual cortex. Among these studies, there were three that were both understandable and interesting.

- **Blindsight**: Patients with damage to the V1 cortex experience a phenomenon called "blindsight", in which the patient "can discriminate the presence, location, orientation, [color] and direction of movement of a target stimulus at levels significantly above chance", even though the patient reports that he cannot actually see these attributes. Some patients have also reported awareness of motion as "black moving on black".
- **Binocular rivalry**: When a patient is presented a different image to each eye, each eye gets exclusive dominance, switching off every few seconds. When examining neural activity, the cortices V1 and V4 did not exhibit behavior that oscilated back and forth. This led to the theory that during rivalry, high-level extrastriate (?) areas are competing, rather than neurons in V1.
- **Bistable perception**: Similar to binocular rivalry, some studies showed that during bistable perception (presenting an ambiguous image), oscilation occurs much more in the higher level MT neurons than in V1. This seems to indicate that the brain combines the information from the two eyes at a later time—a higher level—than V1. However, 20% of oscilation does occur in V1; perhaps this is a result of the feedback connections between MT and V1.

Most of the evidence presented in this paper seems to support the theory that V1 behaves as a backend for the eyes, rather than a frontend for interpretation. This is consistent with the finding that V1 is necessary but not sufficient for awareness: how can you be aware of something visual without your eyes? The feedback component in V1 may exist to help discriminate which information to pass on, as a sort of "attention".

> … [I]f you write convoluted, dense academic prose nobody will understand it and your ideas will be misinterpreted and then the misinterpreted ideas will be ridiculed even when they weren't your ideas.
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> Joel Spolsky on Hungarian Notation