

DOES EVIDENCE ACCUMULATION UNDERLIE PERCEPTUAL CONSCIOUSNESS?

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INTRODUCTION

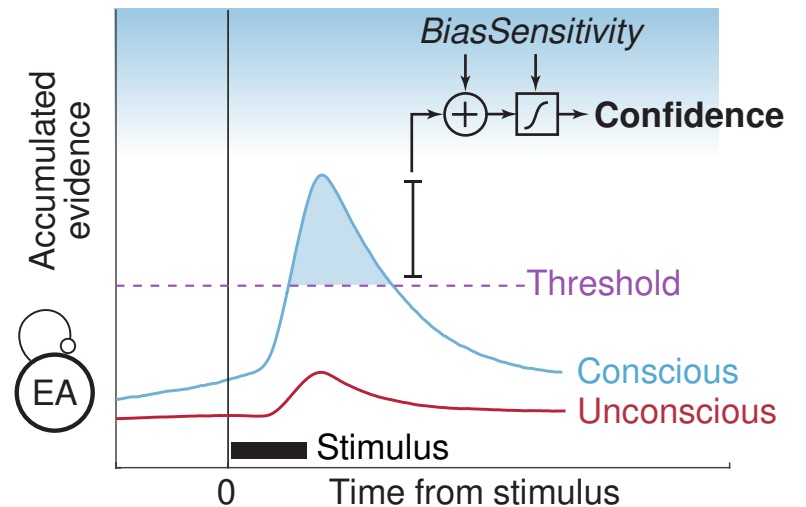
The brain **accumulates noisy sensory information** over time to form a perceptual decision.

Perceptual experience, consisting in conscious perception and monitoring, has been suggested to occur when accumulated perceptual evidence reaches a **decision threshold**.

We ask:

1. Do neural populations accumulate evidence for detection reports in humans?
2. Do these neural populations also respond in the absence of motor or decisional task demands?
3. Are they also involved in perceptual monitoring?

The leaky evidence accumulation process



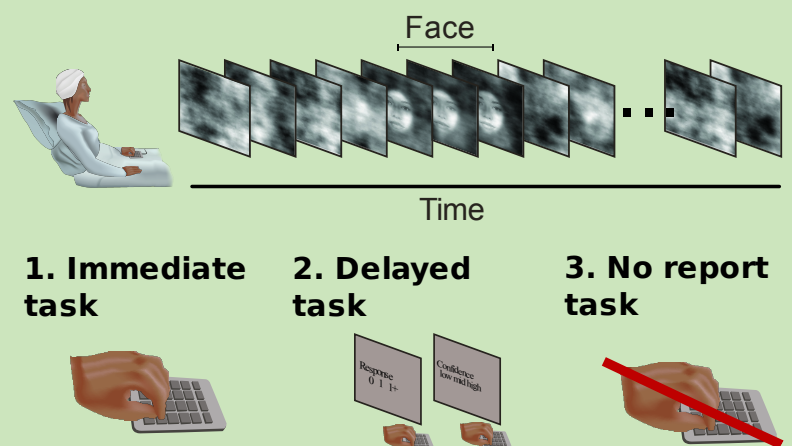
METHODS

Participants were patients with epilepsy implanted with **stereotactic electrodes** for clinical purposes.

We measured **high gamma activity (HGA)** as a proxy for local population neuronal firing.

Participants performed three tasks on face stimuli presented at their individual **detection threshold**.

We collected data from over **2000 channels** (n = 18). Focused analyses were performed on pre-registered **regions of interest (ROIs)**.



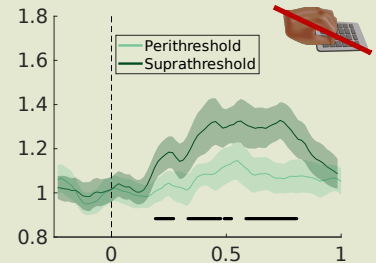
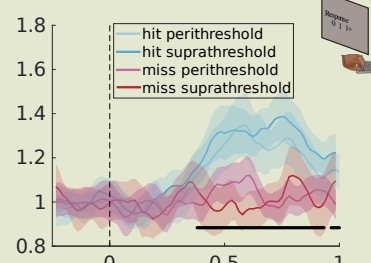
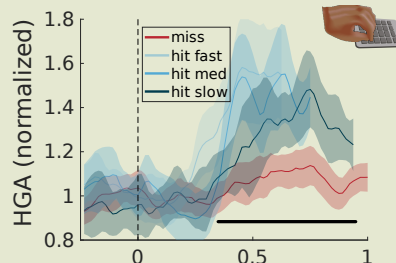
RESULTS

Neuronal populations that **accumulate evidence respond when no task is required**.

ROI analyses indicate that this mechanism is confined to **ventro-temporal regions** (fusiform and surrounding areas).

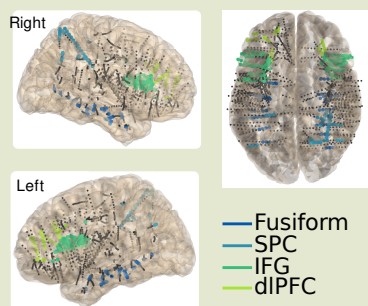


Example channel in fusiform gyrus



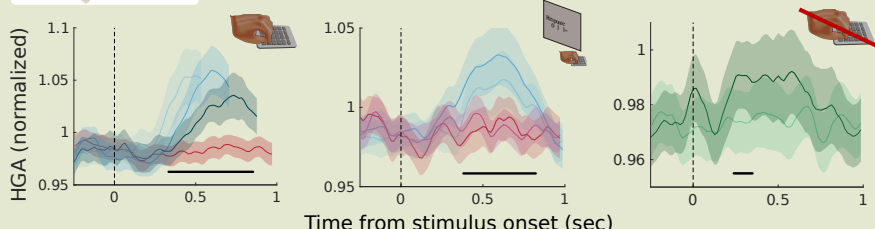
Time from stimulus onset (sec)

ROI analysis



Region	Evidence acc.	Detection	No report
Fusiform	✓	✓	✓
SPC	✓	✓	✗
IFG	✓	✓	✗
dIPFC	✗	✗	✗

ROI results in fusiform



CONCLUSIONS

Ventro-temporal **neuronal populations** are sensitive to:

1. Evidence accumulation.
2. Delayed detection detection.
3. A no report task.

These results are consistent with the view that a percept becomes conscious when the relevant neurons accumulate evidence past a **threshold value**.

Future analyses will focus on whether **other aspects of perceptual experience**, like monitoring, are also encoded by evidence accumulation processes.