Mechanisms of hallucinations in the laboratory

Visual hallucinations are common in some psychiatric and neurological conditions but are difficult to study in the laboratory with healthy participants. One scientific approach is to define "hallucinations" as trials in cognitive tasks during which participants report a stimulus when none were presented (*false alarms*). Unfortunately, such trials seldom occur. Moreover, as for the study of conscious perception, it is difficult to disentangle the perceptual experience of a hallucinations from decisional mechanisms that are at play when participants report seeing a stimulus or not seeing it. This project aims at developing and testing different experimental manipulations that modulate the rate of false alarms or "hallucinations" and use reproduction tasks to infer participants' actual phenonenology.

We have developed a paradigm to systematically compare situations in which a conscious percept occurs with closely matched situations in which it does not (i.e., unconscious processing). In brief, participants see visual "noise" on the computer screen which may contain an embedded picture of a face. Participants are then asked whether they saw a face or not. The intensity of the face defines task difficulty, with high intensity faces being often detected and low intensity faces only seldom detected. To disentangle perceptual experience from decision-making and report, we will not only ask participants to report whether they detected the stimulus but also to reproduce the subjective duration and intensity of their perceptual experience. A computational model will be used to make predictions about the relationship between the different variables (stimulus intensity, participants' answers, timing of the occurrence of a stimulus, trial length, etc…) which we will verify by analyzing the behavior.

The selected candidate will collect and analyze behavioral data and interpret these data with respect to the predictions that were made by the model. Applicants should be comfortable programming with MATLAB and have basic knowledge of statistics.

Applicants should speak basic French in order to interact with the participants of the study. Applicants with a background in engineering, computer science or physics are also encouraged to apply.

The work will take place at the *Grenoble Institut des Neurosciences* in Grenoble.

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