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## DECODING OF LSD-INDUCED PERCEPTUAL CHANGES IN VISUAL AND AUDITORY MODALITIES

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**Background:** The acute effects of d-Lysergic acid diethylamide (d-LSD) in humans include changes in the subjective flow of time as well as distortion of perceptual contents.

**Aims:** We set out to test whether these subjective changes correspond to an amplification of the neural vectors that encode conscious percepts, as estimated by event-related potentials (ERPs). The specific aims are: (1) To use ERPs to determine the timing of LSD influence on the neural vectors coding for a perceptual stimulus; (2) To probe and time the changes in ERP variability; (3) To verify whether d-LSD increases global dimensional complexity; (4) To test the influence of noise on neural vectors, with or without LSD intake; (5) To play sounds while varying auditory parameters, in a way that the subject can simultaneously report the intensity of experienced synesthesia.

**Method:** ERPs are being recorded from healthy participants during two sessions lasting up to 8 hours, with data acquired on two different days, one with 50 µg of d-LSD and one with placebo, in double blind randomized order. There are two main sets of stimuli delivered by a computer, defining the visual and the auditory tasks. The visual stimuli comprise different images appearing on the screen center: faces; fractals; houses; and 3-letter-words in Portuguese. They are presented on a noisy or clear background and moving or not. From time to time, the visual stimulus is missing to study whether expectation, under LSD vs placebo, might support a visual response. A star sometimes appears in the 3rd or the 4th position of the visual sequences, and the participants are instructed to click as soon as possible on the mouse when they see the star. The auditory task was performed with the eyes closed and comprised listening to different tones with distinct volumes. Also, the participants answered questionnaires to measure memory, creativity, anxiety, as well as religious and psychedelic experiences. In addition, we also asked the participants to report a remarkable dream immediately after each block of the visual and auditory tasks.

**Preliminary results:** As of February 2024, we have recorded 22 participants, but due to dropouts on the second recording session ( $n = 7$ ) and movement artifacts on the ERP signal ( $n = 5$ ), we have so far recorded and pre-processed complete datasets from 10 participants. Data analysis is ongoing but conclusive results in a well-powered study depend on achieving a large enough sample ( $n = 20$ ), which we expect to reach by late April 2024.

**Keywords:** Psychedelics, Complexity, Synesthesia

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