closed conditions underscore the state-dependent nature of these connectivity patterns, reinforcing the sensitivity of EEG metrics to subtle neurophysiological changes. Overall, the study provides insight into how long-term, naturalistic psychedelic use might modulate brain dynamics. The integration of multi-level EEG analyses in a relatively large sample allowed to obtain results suggesting potential of these substances to induce enduring changes in neural function. Future research with expanded sample sizes and refined methodological approaches will be essential to corroborate these initial observations and to further elucidate the underlying mechanisms of long-term psychedelic effects on brain network dynamics.

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Single talk session 4; ATTENTION

Talk 1

Psychophysiological Markers of Attention Orienting and Decision-Making Under Hypoxia and Cognitive Load☆

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In extreme environments such as high altitudes, low pressure areas and polluted urban areas, healthy people can experience hypoxia due to reduced oxygen availability in the air. This can lead to significant respiratory and neurocognitive challenges, including respiratory disease, cognitive dysfunction, and brain disorders and injuries. While previous research has examined cognitive impairments in novelty detection, attention and memory, little is known about how hypoxia affects decision-making, and the neural networks involved in attentional engagement. This EEG study aims to investigate the neurofunctional preparatory processes underlying decision making and attentional orienting under hypoxic conditions and different task workloads. To achieve this, a group of healthy participants completed two experimental sessions in which they breathed either ambient air or 12.5% oxygen-reduced air while performing four Posner-based visuospatial selection tasks requiring increasing workload to discriminate between conflicting targets. EEG data were collected from 128 scalp sites, allowing analyses of event-related potentials (ERPs), intracerebral source activity and behavioural reaction times (RTs). The results showed that hypoxia negatively affected the amplitude of the pre-target ERP components ADAN and LDAP, as well as post-target RTs, and particularly impaired decision making during validly oriented attention conditions. The amplitude of the ADAN and LDAP were reduced, whereas RTs were prolonged in the single-choice condition. Furthermore, hypoxia negatively affected decision making in valid attentional orienting scenarios. Under hypoxic conditions, in contrast to single choice, there was increased activation in the right anterior cingulate cortex, left superior parietal lobule and dorsolateral prefrontal gyri during the double choice decision task. Taken together, our findings elucidate the complex relationship between hypoxia, cognitive engagement, and neural network activation, revealing distinct preparatory processes for single versus double-choice decision-making tasks. The negative impact of hypoxia on decision-making efficiency raises important considerations regarding accountability and ethical implications in both clinical and extreme operational contexts.

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Talk 2

Does Attention to Cardiac Sensations Modulate Heartbeat-Evoked Potentials Even After Controlling for Cognitive Demands?☆

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Heartbeat-evoked potentials (HEP) have been shown to be modulated by attentional focus (cardiac vs. exteroceptive attention), suggesting that HEP are a neural correlate of interoceptive prediction errors. However, this effect has not been consistently replicated, and differences in cognitive effort when contrasting interoceptive vs. exteroceptive attention may be a confounding factor. We devised a modified Heartbeat Attention Task to examine whether cardiac attention can modulate HEP amplitude even when cognitive demands are matched across interoceptive and exteroceptive conditions. In exteroceptive blocks, subjects were required to count subtle bursts of volume increase embedded within a continuous white noise. The bursts' volume was individually tailored for each participant (near absolute threshold) and were presented in a rhythmic pattern replicating a typical heart rate. In interoceptive blocks, participants were asked to count their heartbeats, whilst the white noise was still presented, ensuring that the neural effects were driven by the attention shift rather than sensory changes. The task was first completed by 50 participants (25F; 28.44y) during a 9-electrode EEG recording: frontal, central and parietal sites. No significant differences were found regarding counted heartbeats (M=122.00) vs white noise bursts (M=118.86) as well as on perceived attentional efforts (heart M=65.00 vs bursts M=67.00), indicating similar task demands across conditions. No significant differences between conditions were found on HEP amplitude across all electrodes ($p > .137$ for all), suggesting no attentional modulation of HEP amplitude after accounting for cognitive demands. Due to the reduced number of electrodes, a follow-up sample of 26 participants (13F; 21.73y) completed the task using a new EEG geodesic 64-channel sensor net. This dataset is currently under processing and will allow for a more comprehensive data-driven analytic approach (cluster-based permutation test) to ensure whether the attentional modulation of HEP amplitude is indeed absent when accounting for cognitive demands.

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Talk 3

Uncover covert attention in complex environments using pupillometry☆

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