**Posterior orbitofrontal cortex is necessary for acquisition and retrieval of stimulus-outcome associations in outcome devaluation**

Previous work across species has implicated the lateral orbitofrontal cortex (OFC) in goal-directed behaviors, particularly in outcome devaluation, which refers to the ability to adjust choices based on changes in outcome value. However, the lateral OFC is a large, anatomically heterogeneous region, and the specific contributions of its subregions to different cognitive components of outcome devaluation remain largely unexplored. This study addressed this gap by applying network-targeted transcranial magnetic stimulation (TMS) to the anterior (aOFC) and posterior (pOFC) subregions of the lateral OFC. Forty-eight fasted human participants (15 males) completed a 3-session x 2-day outcome devaluation experiment. On day 1 of each session, participants learned associations between visual stimuli and food odor rewards. For a given pair of stimuli, one stimulus predicted a sweet or savory odor, whereas the other predicted no reward. On day 2, participants first consumed a meal matched to either the sweet or savory odor (counter-balanced), reducing the pleasantness of the matched (i.e., sated) odor. They then made choices among visual stimuli predicting non-sated or sated odors, with a preference for non-sated stimuli indicating goal-directed behavior. To examine the differential roles of aOFC and pOFC, we used resting-state fMRI connectivity to identify individual stimulation sites in the right lateral prefrontal cortex (LPFC) most strongly connected to aOFC and pOFC seed regions, respectively (in separate groups of participants). We applied continuous theta burst stimulation (cTBS), either before learning the stimulus-outcome associations on Day 1 or before the meal and choice test on Day 2, to temporarily disrupt brain network function over these stimulation sites. Results revealed that both aOFC- and pOFC-targeted TMS disrupted value acquisition during the discrimination task, but only when administered during the first session. Crucially, TMS targeting the pOFC-but not the aOFC-before the meal on Day 2 impaired outcome devaluation. Similarly, disrupting the pOFC-but not the aOFC-before learning on Day 1 also impaired subsequent outcome devaluation. These findings indicate that the pOFC plays a critical role in both the acquisition and retrieval of stimulus-outcome associations, processes essential for intact outcome devaluation.