Negative bias towards overweight bodies in healthy women: behavioural and EEG evidence in a novel Body-Flanker task

Background and aims: The aim of this study is to investigate the relationship between cognitive control and body image using EEG. The social pressure regarding body image results in women idealizing thinness and calories restraint. As a result, the perception of overweight bodies conveys negative emotions. Behaviourally, this leads to a delayed attentional disengagement from non-thin bodies, an approach bias towards thin-ideal bodies and an avoidance bias towards non-thin bodies. Interestingly, these behaviours are associated to individual body dissatisfaction. We hypothesize that body shape bias could influence performance and evoke specific neural responses in a Flanker task using different body stimuli with various size. **Methods**: We recorded the EEG of 24 neuro-typical female participants as they performed a novel Flanker task, in which they had to respond as fast/accurate as possible to upright/inverted and over/underweight target bodies flanked by in/congruent distractors. **Results**: Behavioural results showed that participants' performance was worse in the underweight-incongruent (underweight target, overweight distractors) body condition. EEG time-frequency analysis of fronto-central Theta (4-7 Hz) power, a biomarker of conflict, confirmed that the Body-Flanker task induced higher conflict for incongruent upright body stimuli. ERPs results spread further light over the processing of conflictual under/over-weight body stimuli. Early holistic processing of bodies was disrupted by inverted bodies (as indexed by N190 amplitudes). Later P2 potential, whose amplitude is positively associated with negative emotional arousal, was larger for overweight than underweight targets. Frontal-N2, a well-established marker of Flanker-induced conflict, showed maximal amplitudes for underweight incongruent stimuli, followed by overweight congruent, overweight incongruent and underweight congruent conditions. Interestingly, such effect was greater in participants with higher body dissatisfaction. **Discussion**: The results confirmed that this version of the Flanker task might be useful in targeting conflictual processing related to in/congruent under/overweight bodies in healthy females and suggest that overweight bodies might generate higher arousal (P2) and increase distractors salience (N2) as a function of preoccupation with body weight/shape. Possibly, the message sent to women by society acts as an implicit bias and shapes body perception, from the first stages of visual processing. Future studies will employ this task to investigate and target body-related conflictual processing (and associated EEG neuromarkers) in people with eating disorders.