

The role of feed-forward projections from V1 to EBA in body visual adaptation: a ccPAS study

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Objective: Body perception can be reshaped by previous experience as documented by visual aftereffects following prolonged exposure to a body with a specific feature. Alterations of these aftereffects could play a role in body misperceptions, as patients with eating disorders show reduced effects to body exposure. Here, we used a cortico-cortical paired associative stimulation (ccPAS) protocol to study the role of feed-forward and reentrant connections within the occipito-temporal cortex in body gender adaptation, whereby exposure to a distinctively female or male body makes androgynous bodies appear as more masculine or feminine, respectively. **Materials.** The task consisted of an Adaptation Phase, in which participants were exposed to male or female sex-typing virtual-human bodies, followed by a Test phase in which they were asked to discriminate the gender of a series of androgynous bodies. The ccPAS protocol consisted of 90 paired pulses of Transcranial Magnetic Stimulation (TMS) delivered over the left extrastriate body area (EBA) and V1 in two 15-min sessions. In one session (V1-EBA), we boosted feedforward connections by applying TMS first over V1 and then, after 20 ms, over EBA; in the other session (EBA-V1), we boosted reentrant connections by applying TMS first over EBA and then, after 20 ms, over V1. **Methods.** We used a within-subjects experimental design in which 34 healthy participants (18 women) underwent the male and female body exposure procedure either after V1-EBA or after EBA-V1 ccPAS, in a counterbalanced order. The Point of Subjective Equality (PSE) for the categorization of the androgynous bodies was calculated after the male and female exposure in the two ccPAS sessions.

Results. In both ccPAS sessions, prolonged exposure to bodies with sex-typing features biased the perception of the androgynous bodies towards the opposite gender. Crucially, these adaptation effects were boosted after V1-EBA as compared to EBA-V1 ccPAS. **Discussion.** In keeping with previous behavioral studies, these results provided evidence of contrast aftereffects for body gender adaptation. Furthermore, they showed that the empowerment of feed-forward projection from V1 to EBA through cc-PAS boosted body gender adaptation. **Conclusion.** This study suggests that body gender adaptation rely on feed-forward cortical connectivity between V1 and body-specific cortical areas in the occipito-temporal cortex. Alterations of these pathways may underlie dysfunctional body adaptation in patients with eating disorders, which could be restored by boosting feed-forward connectivity in the occipito-temporal cortex.

References:

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