The effect of practice with inverted faces on behavioural and ERP horizontal bias

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Background

Information for face identity is carried by contours in a narrow orientation band centred around horizontal. ¹,²

**Horizontal bias**, a measure of the strength of the selective use of horizontal structure, is associated with the identification accuracy of unfamiliar² and familiar³ upright faces, and trained inverted faces.⁴

The N170 for upright faces is driven by horizontal structure⁵,⁶, but the N250 amplitude is related to horizontal bias.⁵

Are face-related ERPs related to the orientation structure of inverted faces, and how does the relation depend on learning?

Methods

**Task:** 1-of-6 inverted face identification task.

- 1.5 s display
- 0.9-1.1 s
- 0.2 s
- 1 s until response

**DV:** response accuracy & EEG

**IV:** Filter orientation (Horizontal/Vertical)

- Bandwidth (±45, 54, 63, 72, 81, or 90°)
- Training (pre/post)

N: 11 young adults (M = 21.9, SD = 2.8, 4 female)

Day 1: identify filtered + full faces (42 trials/condition)

Day 2: identify unfiltered (full) faces (462 trials)

Day 3: identify unfiltered (full) faces (462 trials)

Day 4: identify filtered + full faces (42 trials/condition)

EEG was collected on days 1 & 4

EGI 256 channel, Cz ref., bandpass filtered (1-30 Hz)

Correlations

Full face accuracy was best correlated with behavioural and N250 amplitude measures of horizontal bias, but not N170 amplitude/latency.

Behaviour

Training improved response accuracy to unfiltered, inverted faces.

ERP Results

Training strengthened horizontal bias (i.e., higher accuracy for H than V).

Conclusions

Practice with inverted faces improves face identification and strengthens horizontal bias.⁴

ERPs to inverted faces are more negative after training, but, like upright faces, they are sensitive to orientation structure before training.

Behaviour and N250 amplitude sensitivity to horizontal structure are good measures of horizontal bias.⁸