Introduction

- Preferential use of horizontal information (horizontal tuning) is correlated with upright face identification accuracy and the size of the face inversion effect (Pachai et al., VSS 2011).
- Perceptual learning improves identification of inverted faces, though effects are partially stimulus-specific (Hussain et al., Vis Res 2009; Psych Sci 2011).
- Questions: Does perceptual learning also improve horizontal tuning for inverted faces? Is this change in tuning stimulus specific?

Methods

- 10 AFC identification
- 0.5 RMS contrast
- 250ms stim duration
- All inverted faces

Orientation Filtering
2 centre orientations (horizontal and vertical)
18 bandwidths (0° to 180° in 10° steps)
To retain face-like appearance without adding diagnostic information, filtered targets embedded in an average face.

Example Stimuli

| Target face (face set 1) | Filtered target face (40°) | Inverse-filtered average face | Final stimulus (target + average) |

Day 1 (Pre-Training)
N = 16 per face set
All filter conditions tested
360 trials (10 per condition)

Day 2-4 (Training)
Immediately after pre-training
Unfiltered, inverted faces
300 trials per training day

Day 5 (Post-Training)
One day after training days
All filter conditions tested
360 trials (10 per condition)

Day 6 (Transfer)
3-4 days after post-training
Identical to pre/post
Tested with untrained stimuli

Results

Face Set 1
Proportion Correct as a function of filter before and after 3 days of training with inverted faces. Note: Improved overall accuracy post-training, more so for horizontal than vertical.

Face Set 2
Proportion Correct as a function of filter before and after training. Horizontal Tuning (horizontal – vertical accuracy) as a function of filter before and after training. Note: Increased horizontal tuning post-training, particularly from 60° to 120°.

References

- Pachai et al. (2011). VSS.

Conclusions

Training with unfiltered, inverted faces significantly improves identification and increases horizontal tuning, supporting the claim that horizontal tuning underlies face identification and the face inversion effect. Partial transfer to untrained stimuli suggests learning produced some general improvement in face identification.

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