Characteristic Facial Motion influences Identification Performance

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Introduction

Could you recognize Jack Nicholson or Tom Cruise by their smiles?

Would you realize, if Tom Cruise smiled like Jack Nicholson or vice versa?

Idea:
Combine shape and motion information of individual faces independently.

Would there be a conflict, if face A was animated with face B’s motion?

Aim:
Investigate the relative importance of motion versus shape/texture information in face perception.

Hypothesis:
Facial motion might determine identity when shape information is ambiguous.

Background:
It has been shown that facial movement can enhance identification performance or categorization performance for gender and emotions, when the pictures of the faces where somehow degraded, eg. thresholded, negatives or point–light displays (eg. Bassili, 1979; Lander et al.,1999).

Methods

Animating the heads

Stimuli

Task

Motion similarity within families?

Capture motion in 3D & add stereo

Facial motion similarity within families?

Results

Prediction

Means across subjects

PSE analysis

If characteristic motion can be used for identification, then morphs animated with motion B would be labeled “Face B” more often than the same morph animated with motion A. In other words, when animated with motion B, less % morph of face B is needed to get the same response than when animated with motion A, PSE[B] < PSE[A].

As predicted, the morphs which were animated with Stefans’ motion were more often named as “Stefan” than the same morphs animated with Lesters’ motion. This was only true, when shape information was ambiguous, i.e. 30% – 70% morphs.

The PSEs were significantly smaller, t(13)=2.27, p=0.02 (one–tailed), when the morphs were animated with Stefans’ motion, than when they were animated with Lesters’ motion. Mean of the differences:
PSE[“Stefan”] – PSE[“Lester”] = 2.9 (SE = 1.3).

Conclusion

If you saw Tom Cruise smiling like Jack Nicholson, you would still recognize the person as Tom Cruise. However, if you saw a face that looked like a mixture between the shapes of Tom Cruises’ and Jack Nicolson’s faces and that face was smiling like Jack Nicholson, you would more likely name this person as “Jack” than as “Tom”.

What comes next?

- Enhance or reduce shape/texture cues at training (lighting conditions, texture, averaged heads, aperture)
- Make motion more characteristic
- Capture motion in 3D & add stereo
- Can we ignore the motion? RT?
- Does the effect hold in more realistic settings?