Perceptual similarity between facial emotions in static and dynamic faces
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Question
- Previous studies of facial expressions have mainly investigated the categorisation of static faces displaying stereotypical facial emotions [1].
- How do we perceive the similarity and differences between facial expressions has received far less attention [2].
- We investigated the perceptual similarity of emotional faces using more ecological stimuli. Specifically, we asked whether it is affected by a) facial motion (static vs dynamic), b) emotional categories (within- vs cross-category), and c) stimuli-based similarity (image similarity).

Stimuli and Conditions
We selected videos and images of 5 emotions x 2 intensity levels from 9 actors of the MPI facial Expression Database [5].
We presented pairs of facial expressions (videos or images) under 4 conditions depending on the emotion and intensity of each expression of the pair.

Methods
Dynamic VS Static
- 80 participants
- Pairs of expressions from the same actor, videos or pictures were presented. Participants had to categorize each expression and then rate their similarity.

Intensity Rating and Similarity Rating
- 40 participants
- Pairs of expressions from the same actor, videos or pictures were presented. Participants had to rate each expression’s intensity and then judge their similarity.

Results
Dynamic expressions are recognized more accurately than Static expressions.
Within-category expressions are perceived as more similar than Cross-category expressions.

Image-based Similarity and its relation to Perceived Similarity
- The dissimilarity of two images is given by the Euclidean distance between their responses to 80 Gabor filters on a 10 x 10 grid.
- A feature vector is obtained from the 80 filters at each of the 100 positions.

Summary
a) Facial motion improve the emotion recognition of facial expressions, but it does not affect the perceptual similarity between two facial expressions and their emotion intensity.
b) Within-category expressions are perceived as more similar than cross-category expressions. Perception of emotional intensity was also more similar for the former than for the latter.
c) Both semantic and physical similarity contribute to the perception of emotional similarity in Static and Dynamic faces.

References