



There is no categorical effect for the discrimination of face gender using 3D-morphs of laser scans of heads

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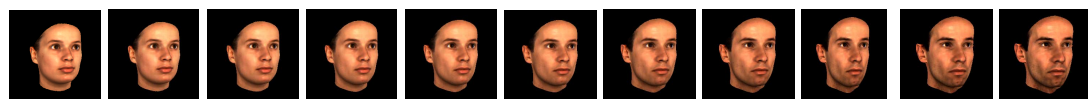
1 INTRODUCTION

In earlier studies (ARVO 98) we could find no evidence for perceptual categorisation of gender using unfamiliar human faces. Here we investigate whether familiarizing participant with the stimuli prior testing might favor categorical perception as it has been reported for face identity (Beale and Keil, 1995, Levin and Beale, 2000). In a second experiment, we tested whether using averaged faces instead of individual faces might reduce the facial variations related to identity and thereby favor categorical perception of gender.

2 STIMULI AND PROCEDURE

For the first experiment we used 6 males and 6 female 3D heads (hair removed) obtained with a 3D head-scanner (Cyberware™). 3D-Morphs were created between male and female faces using an algorithm finding automatically corresponding pixels between 3D-images of faces (Vetter and Poggio, 1997). In the familiarisation experiment, the participants were familiarised with the 6 male and 6 female original faces prior testing. For the second experiment, we used the same method to generate an average face from 100 male and 100 female faces. From this face we created morphs between an average female and an average male face.

20 deg view: individual faces



20 deg view: average faces

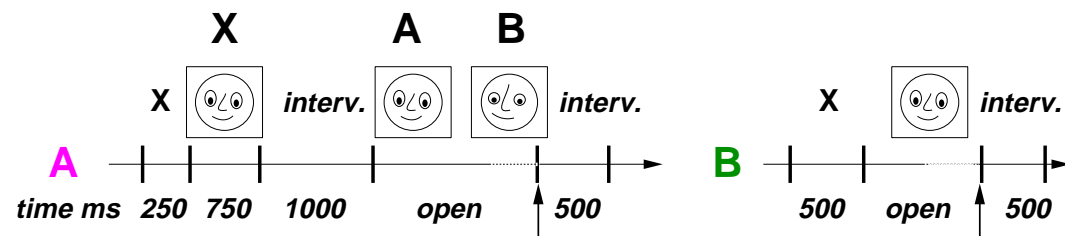


A. Discrimination task. ABX Participants were asked which of a pair of images matched the first face presented in the trial.

AB Participants were asked which image of a

pair was more feminine

B. Categorization task. Participants had to categorize each face image as male or female.

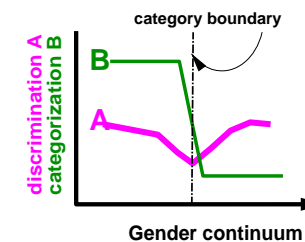


3 HYPOTHESES

If gender perception is categorical, we expect that:

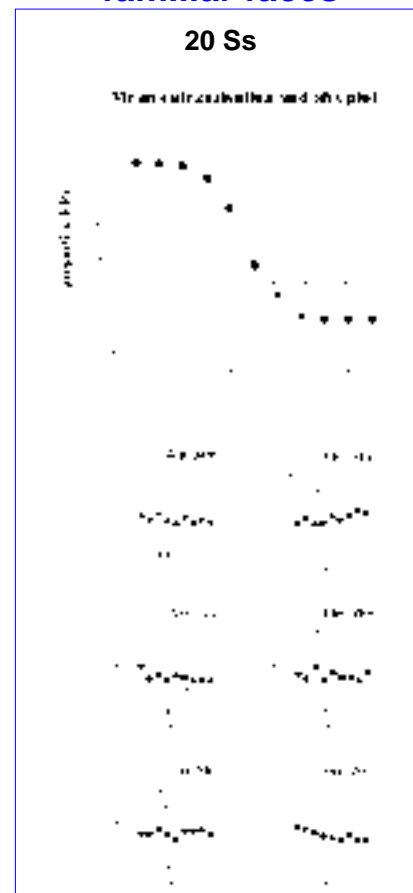
A. In the **discrimination** task, pairs of faces are discriminated more accurately when they straddle the category boundary than when both faces belong to the same category.

B. In the **categorization** task, all faces are perceived as either male or female, with a sharp change around the gender boundary although the presented faces are evenly distributed along the artificial gender continuum.

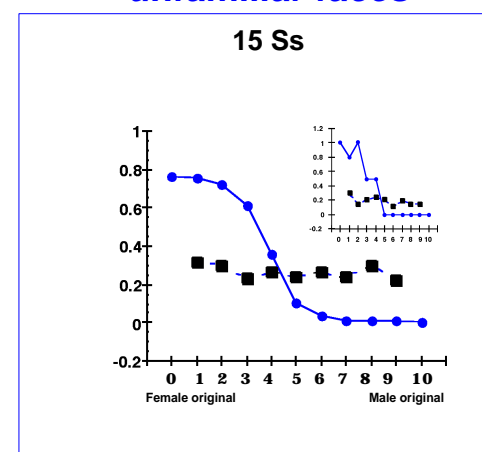


4 RESULTS

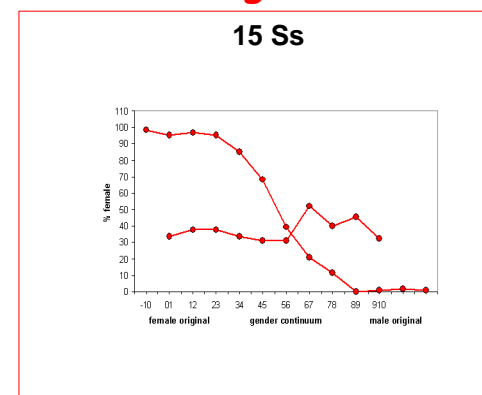
familiar faces



unfamiliar faces



average faces



5 RESULTS SUMMARY

In both experiments the participants could categorize all faces by their gender in the categorization task (characteristic step function). Prior familiarisation with the endpoint faces or the use of averaged faces lacking individual features did not induce a visible categorical effect for the perception of gender; participants did not discriminate more easily between face images straddling the category boundary.

6 GENERAL DISCUSSION

The results suggest that we do not perceive the gender of a face categorically. We might use other cues (like hair line, hairdo, make-up, and expression) when facial features do not provide sufficient information about the gender of a person.

7 REFERENCES

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Levin D.T and Beale J.M. (2000). Categorical perception occurs in newly learned faces, other-race faces, and inverted faces. *Perception and Psychophysics*, 62, 386-401.

Vetter T. and Poggio T. (1997). Linear Object Classes and Image Synthesis from a Single Example Image. *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, 19:7, 733-742.