Configuration or surface? Cues accounting for the horizontal tuning of face identification

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Résumé

When participants are asked to identify face-images with access only to the luminance variations contained in one orientation range, their performance is higher in the horizontal range compared to other orientations. To elucidate the nature of the information contained in the horizontal range of the face stimulus, we compared the effects of image-plane inversion and contrast polarity reversal (i.e., negation) on the orientation profile of face identity recognition. Inversion and negation prevent the specialized processing of face identity by disrupting presumably distinct sources of information: feature configuration and surface properties, respectively. We tested participants in a face recognition task using familiar celebrity images. The images were filtered in orientation (from 0◦ to 150◦ in steps of 30◦) and presented in one of 3 conditions: upright-positive, inverted, or negated. We fitted a Bayesian Gaussian mixed model to the inversion and negation effects across orientations. Overall, inversion impaired sensitivity more strongly than negation but the orientation profiles of the inversion and negation effects were similar and correlated at the subject level. This indicates that inversion and negation similarly disrupt the access to the oriented content of the human face. The fact that both effects peak in the horizontal range indicates that this orientation provides access to the optimal configural and surface cues for the specialized processing of face identity. The horizontal range of face information being the most vulnerable to image manipulations which –though radically different at the pixel level– are especially harmful to face perception, further supports the utmost importance of this range for the representation of face identity in the human brain.

Mots-Clés: Inversion, Contrast negation, Face Identification, Orientation selectivity

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