

The first milliseconds of a face.

Early processes in the recognition of faces

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Introduction

Face recognition is an intensively investigated field in cognitive psychology, but till now, there is not much knowledge about the specific processes, that make such a complex skill possible (VanRullen & Thorpe, 2001). An often used stimulus in face recognition experiments is the so-called Thatcher face. In such faces, the eyes and the mouth are rotated 180°, which gives them a grotesque looking, if this face is presented in the normal upright way. But when presented upside-down (rotating 180°), the alteration is hardly seen and the grotesqueness vanishes (Thompson, 1980). This impressive phenomenon was often used as to investigate the recognition and memory of faces, but not to give an insight to the processes underlying them.

Method

Procedure

To test specific hypotheses in early stages of face processing, we used two different presentation times (PT) of "thatcherised" or original famous faces. Participant's task was to categorise each face in a 2AFC (yes/no) name-face verification task. If a face was recognised as been altered in any kind or belonging to a different identity, the subjects had to reject this face with a NO. In all other cases, they had to answer with YES. In 50% of all cases, a different identity was asked for in the question; the base rate of thatcherised faces was also 50%.

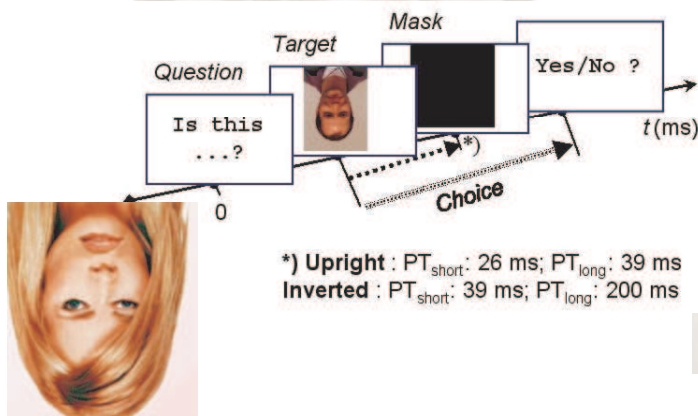
Material

9 female famous faces, each of them was used in an original and a thatcherised version.

Subjects

N=26 (age: 24.5; 19 female)

Time Course and events in each trial

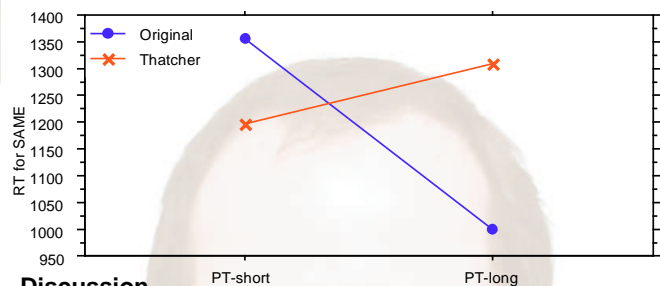


Hypothesis

If faces are initially identified by local component features which are easier to process in their usual orientation, then Thatcher faces should be advantageous under short PTs; On the other hand, under longer presentation times thatcherisation might be disadvantageous due to inconsistencies in the overall image which are only detected when more processing time is available.

Results

We analysed the reaction times (RT) of the Yes-answers over all subjects in the UP-condition (upright faces) with a repeated measurement ANOVA with the within factors PT (short vs. long) and FACECLASS (Thatcher vs. Original) and revealed a significant interaction between these factors ($F(1,24)=10.7$; $p<.005$): inverted thatcherised faces were identified FASTER than original faces if seen with a very short PT (26 ms) and vice versa with a longer PT (200ms) (both differences were tested with a one-tailed t-test).



Discussion

Inverted Thatcher faces were identified faster than original faces under the short PT. The only difference between these two face classes is the rotation of the eyes and the mouth, so that these parts are already in the right orientation to identify them without the need of a rotation process. It seems that the first relevant process in the identification of a face involves the processing of the eyes/mouth without a further test of coherence with the outer areas of the face. With increasing inspection time, the disorientated features in a Thatcher face become disadvantageous, possibly because the features are now detected to be incoherent with the rest of the face, which is inverted. This experiment demonstrates, that a stimulus class like the Thatcher faces can be very useful for testing specific processing hypotheses.

References

- Thompson, P. (1980). Margaret Thatcher -- A ne illusion. *Perception*, 9, 483-484
- VanRullen, R. & Thorpe, S.J. (2001). The Time Course of Visual Processing: From Early Percept to Decision-Making. *Journal of Cognitive Neuroscience*, 13(4), 454-461.