



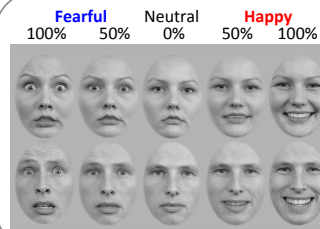
Happiness is in the mouth of the beholder and fear in the eyes



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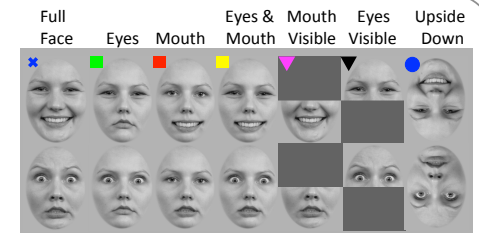
Introduction

- There is considerable evidence to suggest that we find it easier to recognise Happiness compared with other facial expressions^{1,2,3,4}.
- We need to know the relative contribution of each of the features in the face in driving this sensitivity.
- We also need to know how this may change depending upon the expression.



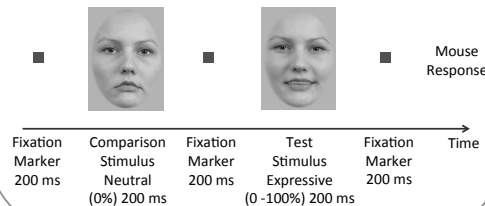
Stimuli

- Images generated using 6 Actors (3 male and 3 female) from Radboud Face Database.
- Matched average mean luminance of images.
- Norrkross Morph X used to generate images with different signal strengths (0-100%).
- Eyes, Mouth and Mouth & Eyes conditions created by superimposing expressive features on a neutral face.

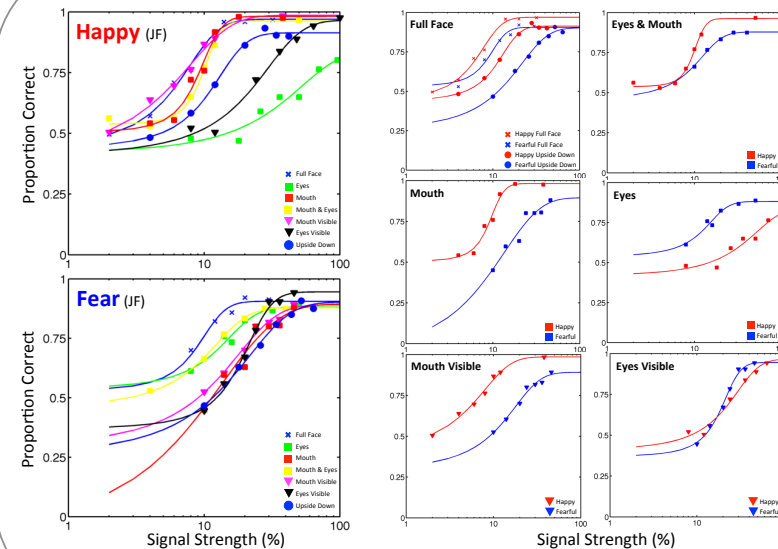


Methodology

- Temporal two-interval forced-choice paradigm.
- Method of constant stimuli:
 - Emotion signal of comparison stimulus fixed (0% neutral).
 - Emotion signal of test stimulus varied (0-100%).
- “Which interval contained the image with the greatest expression?”
 - First or second (single click or double click of mouse).
- 240 observations per data point. (40 per Actor, 6 Actors per point)
- Presented using a Mac Pro on a Samsung SM2233RZ 22” LCD monitor (refresh rate = 120Hz) using Matlab 7.7.0 and Psychtoolbox routines.



Results



Each graph shows data from one observer. Happy graph is representative of data from 3 observers. Duration = 200 ms, Viewing Distance = 50 cm, Image Size = 19° x 27°.

Summary of Results

- As signal strength increases performance improves from chance (0.5) to accurate (1). This improvement occurs for both Happy and Fearful expressions and for all experimental conditions.
- The curve representing Full Face stimuli is shifted to the left of other curves for both Happy and Fearful expressions. This indicates that it is easier to detect Full Face stimuli compared with stimuli with limited expressive information.
- There is an advantage for Full Face stimuli that are upright. This implies that the affect conveyed by upright stimuli increases their salience.
- For Happy expressions, curves representing conditions in which the Mouth is expressive are shifted to the left of those in which the eyes alone are expressive.
- For Fearful expressions, curves representing conditions in which the Eyes are expressive are shifted to the left of those in which the mouth alone is expressive.
- These findings indicate that the mouth is the most salient feature for Happy expressions and the eyes are the most salient features for Fearful expressions.
- There is increased sensitivity for Happy expressions in all conditions except Eyes and Eyes Visible. In these conditions there is increased sensitivity to Fearful expressions.

Discussion

- It is easier to detect Full Face stimuli compared to stimuli with limited expressive information. This implies that all of the information in a face is used to detect and recognise emotions from facial expressions.
- It is easier to detect expressions in Full Face stimuli that are upright compared with when they are Upside Down. This implies that the affect conveyed by the upright stimuli increases sensitivity to the stimuli. This advantage appears to be greater for Fearful compared with Happy faces.
- It is easier to detect Happy expressions when the Mouth is expressive. This implies that the most salient feature in Happy expressions is the mouth.
- It is easier to detect Fearful stimuli when the Eyes are expressive. This implies that the most salient feature in Fearful expressions is the eyes.
- For some participants there is similar sensitivity to Full Face stimuli and Mouth Visible stimuli for Happy expressions. This suggests that these participants are selectively attending to the lower half of the image for Happy faces
- We need to further investigate the role of attention in emotion recognition.

References

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2. Du, S. & Martinez, A. M (2013) Wait, are you sad or angry? Large exposure time differences required for the categorization of facial expressions of emotion. *Journal of Vision 13(4):13 1-13*
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