

Learning to Discriminate Invisible Emotional Facial Expressions 184.01

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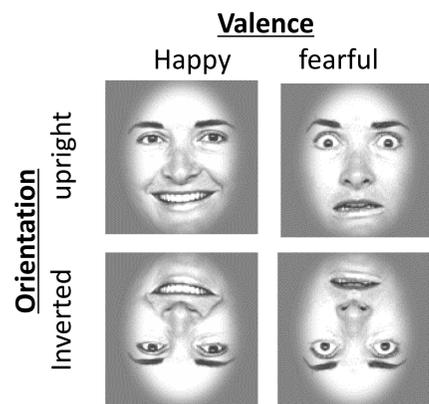
BACKGROUND

Previous work suggest that the amygdala responds to affective information even when it is presented outside of conscious awareness [1]. To what degree such activity can be utilised for behaviour is yet unknown. We used a feedback training procedure to investigate changes in observers' discrimination judgments when emotional facial expressions were invisible.

RESEARCH QUESTIONS

- Does feedback training improve observers' performance in discrimination of invisible emotional faces?
- Is the improvement in performance greater when face is presented upright compared to when face is presented inverted?

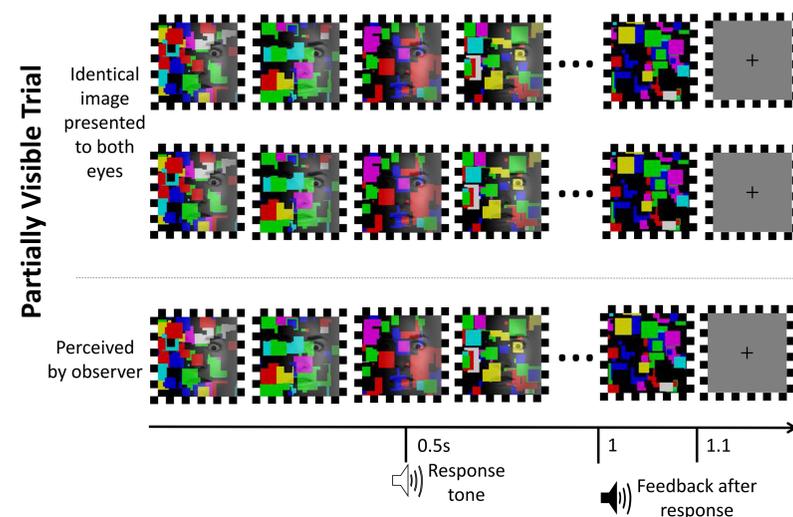
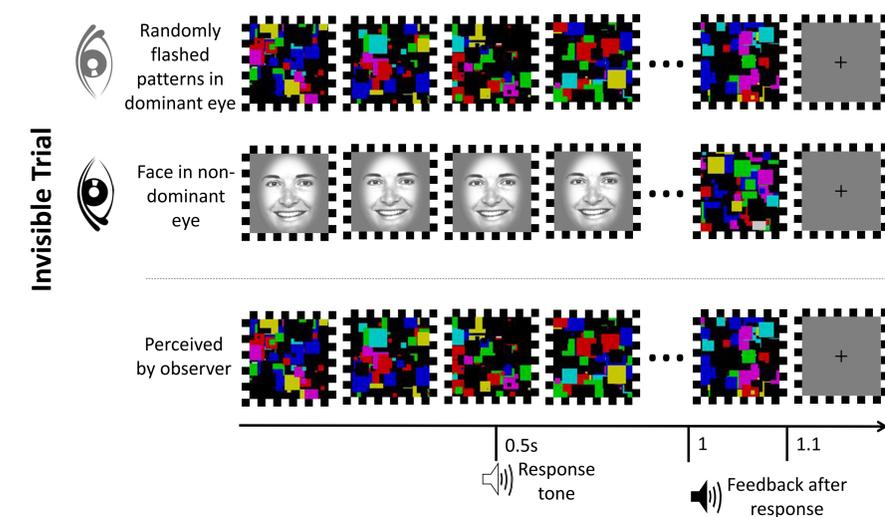
FACE STIMULI



Face contrast reduced by 80%

- 8 Ekman face images: 4 (2 female) individuals
- Valence: happy & fearful
- Orientation: upright & inverted

PROCEDURE



Observers

- 21 (9 female) participants

Methods

- 500 trials (Partial visible trials: 24 trials) each day
1500 trials in total
- Invisible, partially visible trials randomly presented
- Upright and Inverted conditions completed one day.

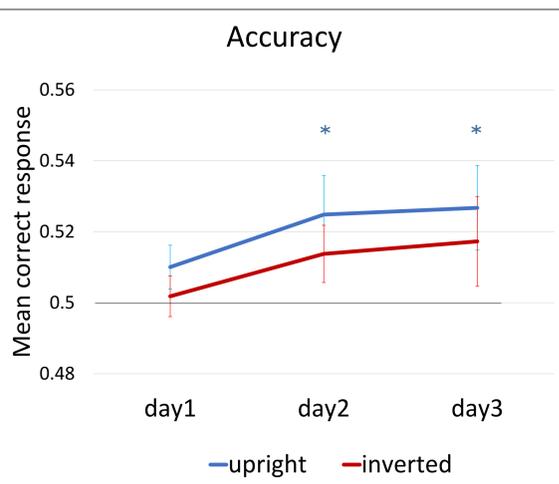
Response

- 2-AFC emotion discrimination task:
Happy Face or Fearful Face?
- When face was physically detected, press space bar (no feedback provided)

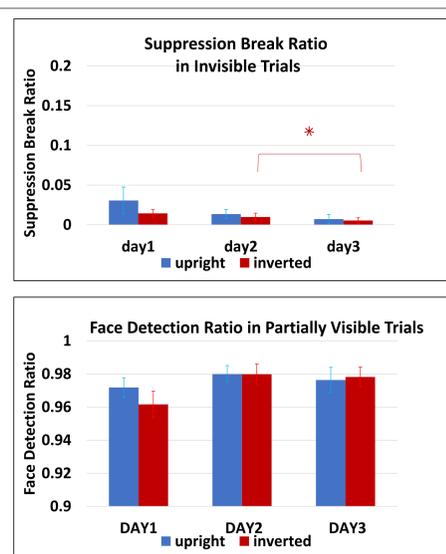
Purpose of partially visible trials

- To confirm that participants reported detection of face when they physically perceived a face
- To confirm that participants' criterion for face detection did not change throughout training period

RESULTS



Performance between upright and inverted conditions was not statistically different. However, Emotion discrimination of affective facial expressions improved only in upright condition on day 2 and day 3. No significant changes in performance for inverted condition was observed.



The ratio of the trials where the p participants could see portions of the face (suppression break) was not statistically different between upright and inverted condition throughout training. Overall, suppression break was minimal.

The probability of face detection response in partially visible trials was not statistically different between upright and inverted condition throughout training. Participants' performance in partially visible trials was well above chance level.

WORK IN PROGRESS

Aim: To confirm that the performance improvement observed in the emotion discrimination task was based only on the emotional contents processed subliminally.

Experiment 2 Question

Is the performance in LSF condition greater than in HSF condition after feedback training?



High Spatial Frequency

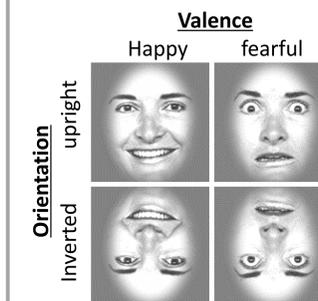


Low Spatial Frequency

Face Stimuli:
HSF vs. LSF
(greater amygdala response to LSF than to HSF [3].)

Experiment 3 Question

Is the performance improvement in emotion discrimination task greater than in gender discrimination task?



Task: Was invisible face female or male?
(emotion unrelated task using emotional stimuli)

CONCLUSION

- We found evidence of feedback training on the discrimination of invisible emotional faces.
- The training effect was observed only when face was presented upright.

Reference

- [1] Morris, Öhman & Dolan (1999), *Proceedings of the National Academy of Sciences of the United States of America*; Whalen et al. (1998), *The Journal of Neuroscience*.
- [2] Tsuchiya & Koch (2005), *Nature Neuroscience*.
- [3] Vuilleumier, Armony, Driver & Dolan (2003), *Nature Neuroscience*.

Acknowledgement

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