

The effect of mouth opening in emotional faces on subjective experience and the early posterior negativity amplitude



Sandra J.E. Langeslag, Liselotte Gootjes, and Jan W. van Strien
University of Missouri - St. Louis, United States & Erasmus University Rotterdam, The Netherlands



Introduction

- Role of the mouth region in emotional expression is understudied
- **Research question 1:** Does mouth opening affect the subjective experience in response to angry, happy, and neutral expressions?
- Mouth region may affect how much attention is paid to the face¹
- **Research question 2:** Does mouth opening affect early automatic attentional capture, as measured by the early posterior negativity (EPN)² to angry, happy, and neutral expressions?
- There are gender differences in emotional processing; both face and observer gender may play a role³
- **Research question 3:** Do the effects of mouth opening in angry, happy, and neutral faces on subjective experience and the EPN vary with the gender of the face and the gender of the observer?

Methods

- Study 1: 21 participants (22-38 years, 5 men)
- Study 2: 39 participants (18-30 years, 19 men)
- 60 male and female angry, happy, neutral with mouth open and closed from NimStim Set of Facial Expressions (Fig. 1)
- Rapid serial visual presentation task, 3 pictures per second
- 32-channel EEG registration (Biosemi)
- EPN amplitude (150-225 ms and 225-300 ms) at O1, Oz, and O2
- Valence and arousal ratings

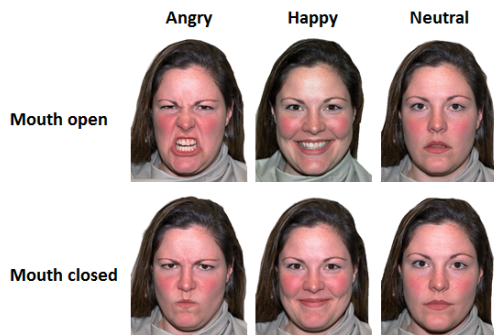


Fig. 1 Example stimuli

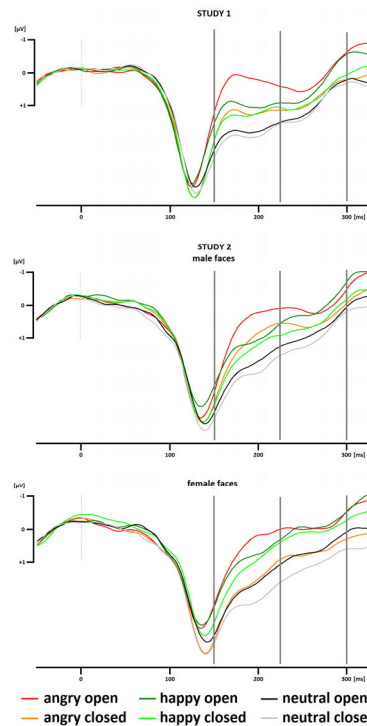


Fig. 3 ERP waveforms averaged across O1, Oz, O2

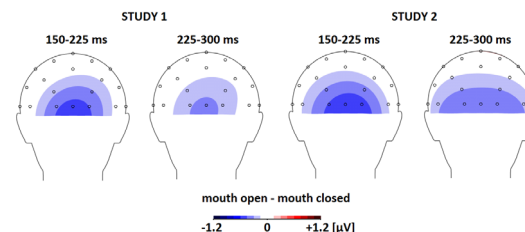


Fig. 4 Scalp topographies of mouth effects

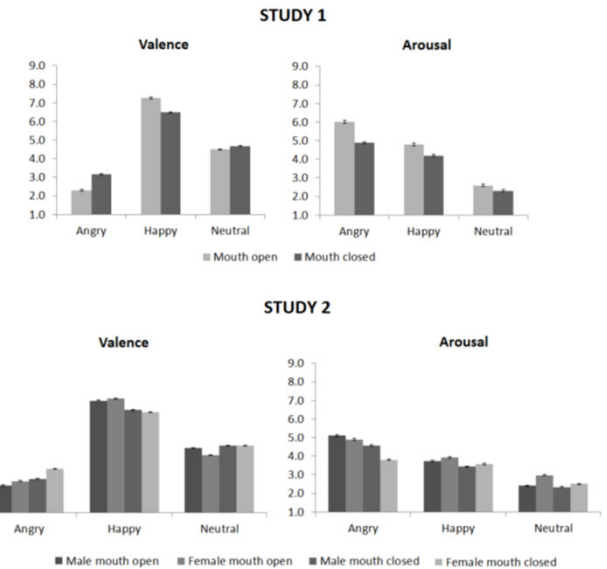


Fig. 2 Valence and arousal ratings

Results and Discussion

- Angry and happy faces (and neutral faces to a lesser extent) with an open vs. closed mouth made observers feel more extreme valence and arousal (Fig. 2)
- There was an EPN for angry and happy (vs. neutral) faces (Fig. 3)
- There was an EPN for angry and happy faces (and neutral faces to a lesser extent) with open vs. closed mouths (Figs. 3 & 4)
- So, emotional faces capture early automatic attention more with open than closed mouth
- Effects of mouth opening were somewhat modulated by face gender, but not by observer gender
- Findings contribute to knowledge of facial expressions and social interaction
- Findings have relevance for social robotics and digital animation

References

- 1 Horstmann et al. (2012) *Journal of Vision*
- 2 Schupp et al. (2006) *Progress in Brain Research*
- 3 Proverbio (2017) *Journal of Neuroscience Research*