Pupil size during authenticity recognition in laughter and crying

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Introduction

The ability to infer the authenticity of other's emotional expressions is a social cognitive process taking place in all human interactions.

Authentic laughs can foster trust and social bonding, and acted laughs may signify a benign polite agreement. In turn, authentic cries are generally expressed to request help, whereas acted crying is associated with manipulative deceit. The capability of producing these expressions deliberately, instead of genuinely, and the ability to recognize them, can be advantageous for social cooperation, affiliation or deception[1].

Research has found listeners recognize authenticity in laughter at roughly 70% accuracy[2]. Furthermore, in passive listening, the perception of authenticity differed such that acted laughs, when compared to authentic, recruited brain regions associated with mentalization processes to solve the social ambiguity of the stimuli[3]. Additionally, authentic nonverbal vocalizations have been rated more arousing than acted[4].

However, it is still unknown whether the evaluation of the authenticity of another's emotional expression is concomitant of an autonomic nervous system response, such as pupil dilation, a well-known proxy of cognitive load and arousal, in the person perceiving it.

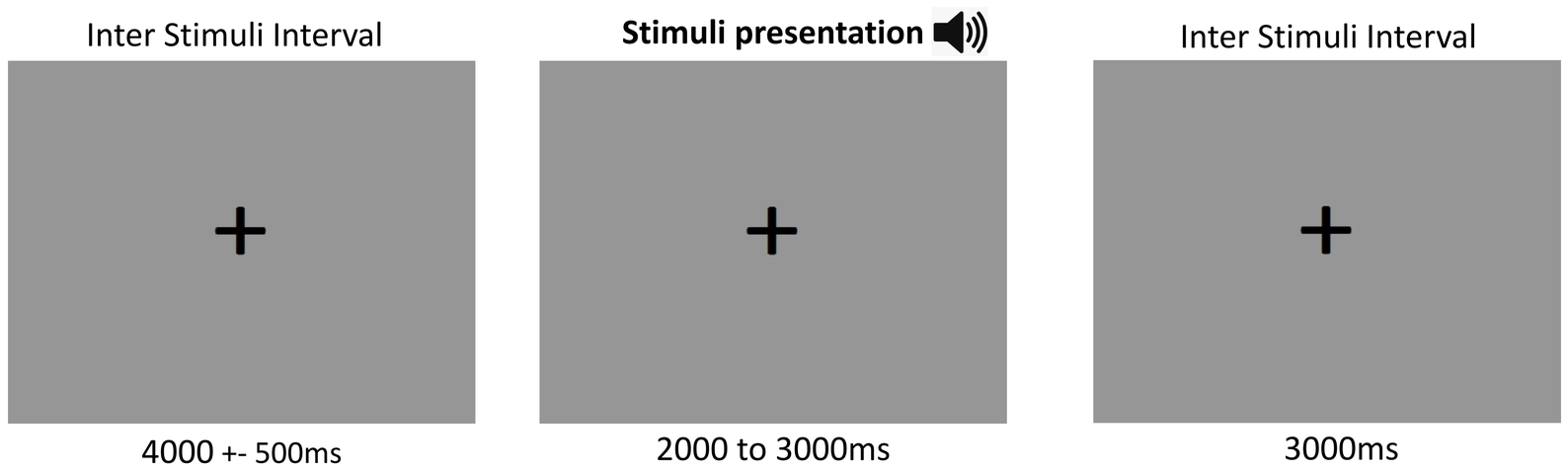
Methods

28 Participants (13 male, 15 female) listened to nonverbal vocalizations:

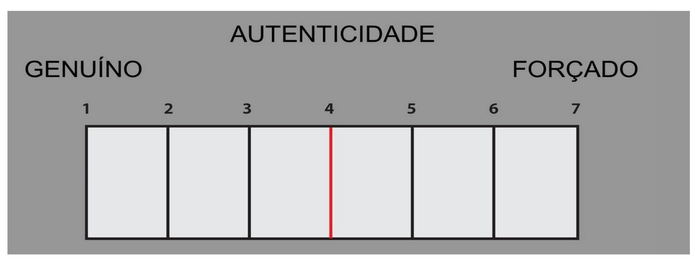
Authentic Laughs
Acted Laughs

Authentic Cries
Acted Cries

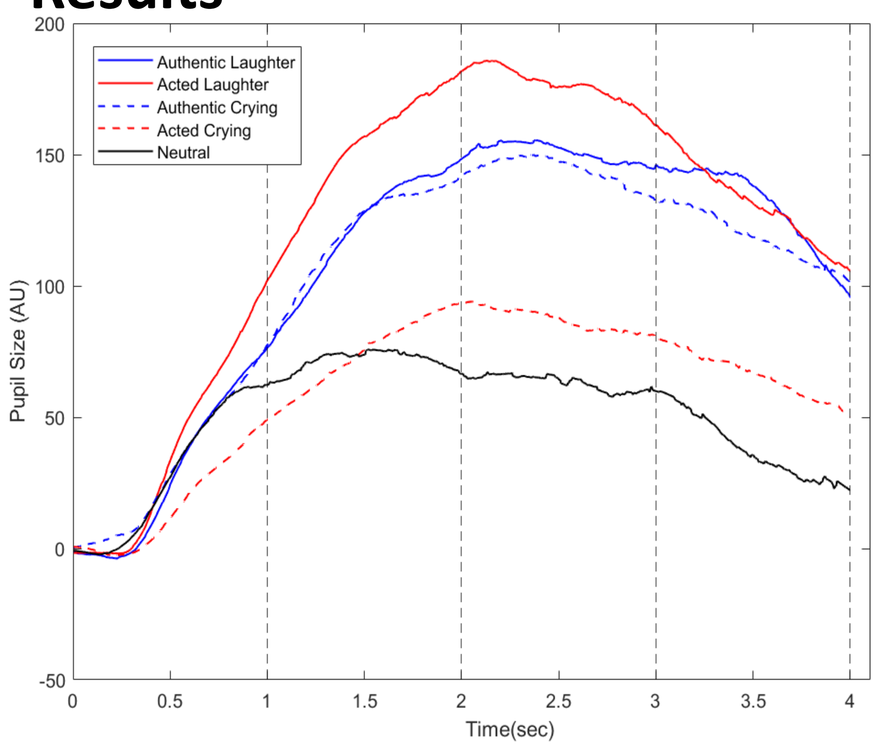
Neutral



Eye Tracker – **EyeLink 1000plus**



Results

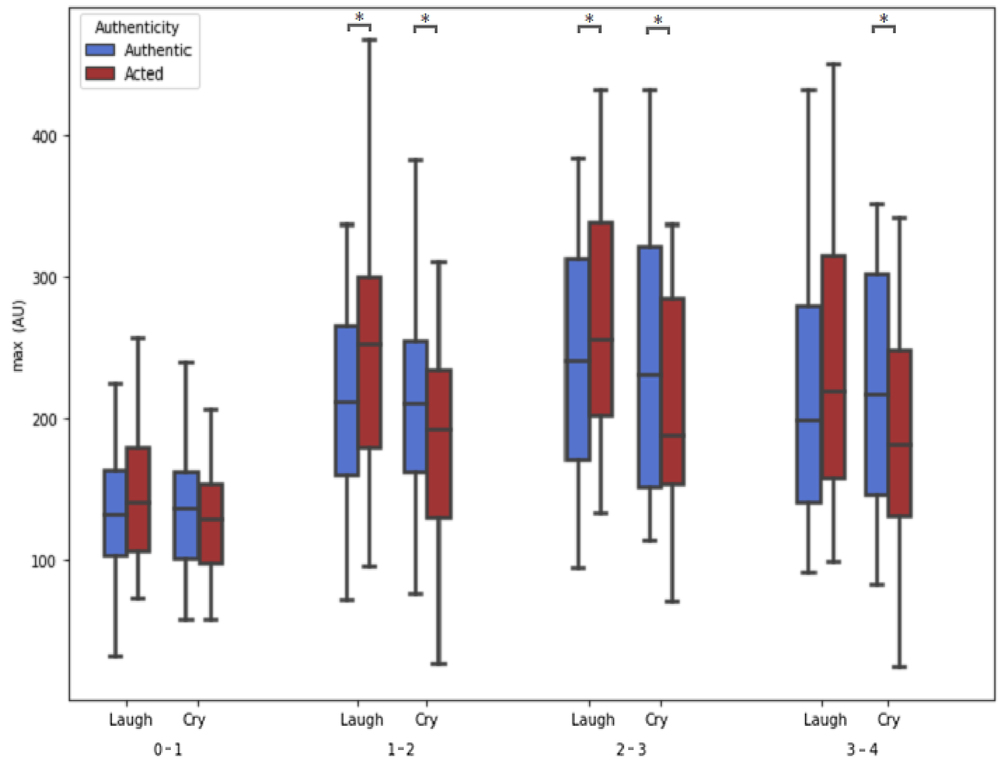


Maximum pupil dilation was analyzed in 1 second time windows post stimuli presentation

Interaction: Authenticity x Emotion

0-1s: not significant
1-2s: F (1, 24) = 6.97, p = .014 , η_p^2 = .225
2-3s: F (1, 26) = 7.61, p = .010, η_p^2 = .227
3-4s: F (1, 26) = 6.15, p = .020, η_p^2 = .191

Pupil Dilation:
Laughs: Acted > Authentic
Cries: Authentic > Acted



Discussion and Conclusion

In our study, the participants were less accurate in recognizing the authenticity of laughs (63%) compared to cries (69%). Previous evidence show that acted laughs recruit areas associated with mentalization processes, and thus, require more effort to solve the social ambiguity of the sound[3]. Hence, our results of higher pupil dilation for acted laughs compared to authentic hint towards an effect of cognitive load on pupil dilation during authenticity recognition in laughs.

Furthermore, in our study, authentic cries were rated more arousing than acted. Previous results show higher activation of the amygdala, an area associated with arousal, when participants listened to cries compared to laughs[5]. Altogether, along with our authenticity recognition accuracy results, cries are suggestively more hard-wired and difficult-to-fake, thus, higher pupil dilation for authentic cries compared to acted may reflect an effect of arousal on pupil dilation during authenticity recognition in cries.

In conclusion, we show for the first time, that the recognition of authenticity can be manifested at the level of the autonomic nervous system in humans, which may index its cognitive recruitment and arousal degree.

References

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