

# Expectation of Social Interaction with a Virtual Agent based on Mutual Gaze Duration

Alexandros Rouchitsas<sup>1\*</sup> and Agnieszka Wykowska<sup>1,2</sup>

<sup>1</sup>Humans and Technology, Lulea University of Technology, Lulea, Sweden,  
<sup>2</sup>Center for Human Technologies, Italian Institute of Technology, Genoa, Italy  
\*alexandros.rouchitsas@ltu.se

## Introduction

- Both gaze direction [1] and gaze duration [2] affect social perception and cognition.
- But, how do they interact to modulate inferences concerning communicative intent?
- Do we infer intention to engage socially if we cross gazes for a mere second or is prolonged eye contact required in order for any expectation that a social scenario may soon unfold to be raised?

## Method

- In our facial expression identification paradigm, an avatar face was presented with a neutral facial expression and direct or averted gaze for 500, 1200, 3300 or 6000 ms. Then, it produced either a social facial expression (polite/non-Duchenne smile) [3] or an arbitrary, noncommunicative one (cheek puff) [1]. Participants (N=18, 13 female, age M=28.4, SD=5.8) fixated on the avatar's eyes and made speeded judgments about said expressions, using a two-choice keypress response. Closed eyes served as our control condition.

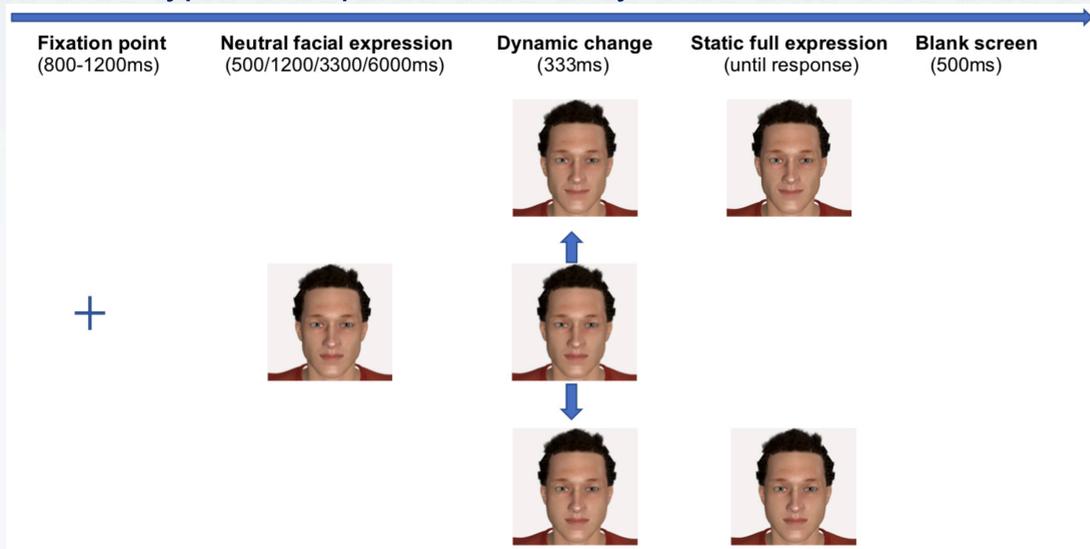


Figure 2. Example stimuli used in the study. On the left, Roxie, our female avatar, is producing a polite/non-Duchenne smile. On the right, she is producing a cheek puff. All experimental stimuli were created in Poser Pro 11 and presented in E-Prime 3.0.

## Results

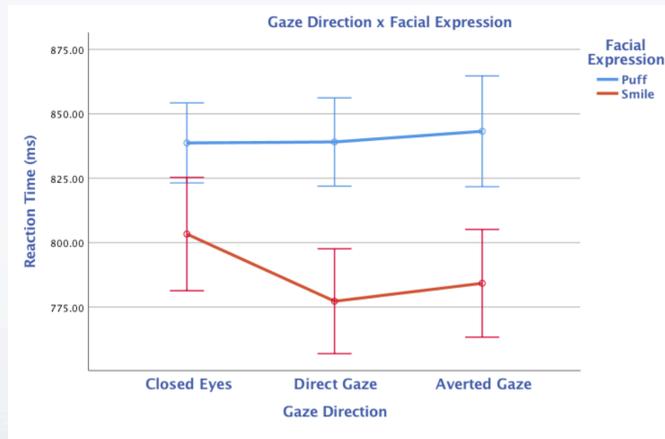


Figure 3. Interaction between gaze direction and expression as a result of a three-way repeated measures ANOVA,  $F(2,34)=3.599$ ,  $p = 0.038$ . Vertical bars denote 95% confidence intervals adjusted to within-subject design.

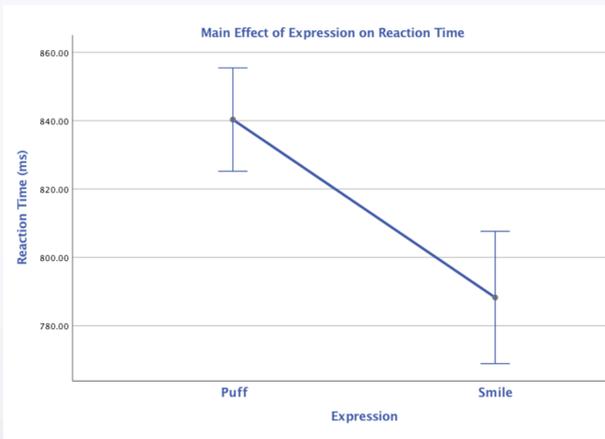


Figure 4. Main effect of expression as a result of a three-way repeated measures ANOVA,  $F(1,17)=75.957$ ,  $p=0.000$ . Vertical bars denote 95% confidence intervals adjusted to within-subject design.

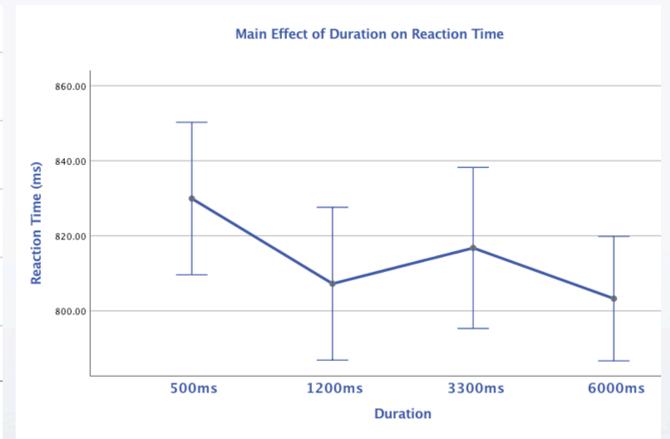


Figure 5. Main effect of duration as a result of a three-way repeated measures ANOVA,  $F(3,51)=3.641$ ,  $p=0.19$ . Vertical bars denote 95% confidence intervals adjusted to within-subject design.

- Reaction to a polite/non-Duchenne smile was significantly faster in the context of mutual gaze compared to that of closed eyes (M=27, SE=8),  $t(17)=3.39$ ,  $p=.003$ .
- Reaction to a polite/non-Duchenne smile was significantly faster than to a cheek puff in all gaze direction conditions: Closed eyes (M=35, SE=11),  $t(17)=3.26$ ,  $p=.005$ ; Direct gaze (M=62, SE=7),  $t(17)=8.83$ ,  $p=0.000$ ; Averted gaze (M=59, SE=8),  $t(17)=7.77$ ,  $p=.000$ .
- All other effects and interactions were nonsignificant.

## Discussion

- Reaction to a social facial expression is facilitated by mutual gaze, whereas reaction to a noncommunicative one is not.
- Perceived eye contact prepares us to engage socially and interact with conspecifics.
- Eye contact duration does not necessarily modulate this preparatory effect.

## References

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- [3] Ochs, M., Niewiadomski, R., & Pelachaud, C. (2010). How a virtual agent should smile? In *International Conference on Intelligent Virtual Agents* (pp. 427-440). Springer, Berlin, Heidelberg.