Facing danger: Learning to avoid punishment through facial responses during social interactions

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Introduction

• Optimal communication depends on both the situation (e.g. dangers) and the identity of your interaction partner[1].

• Learning to adjust facial expressions during communication is key to social functioning[1].

• Individual characteristics, such as dominance[2], might affect the expression and learning of facial expressions.

Question

• How do we learn to use our facial expressions in response to others' facial expressions?

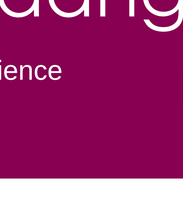
• What is the influence of face dominance[2] on this communication process?

Methods

• A novel method based on online integration of electromyography (EMG) signals was developed and validated on 58 participants (28 female) EXP. 1) and tested on 60 participants (30 female) manipulating face dominance (EXP. 2).

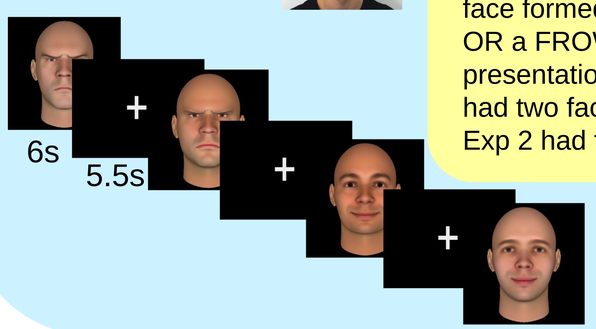
PROCEDURE 96 trials

EXP. 1

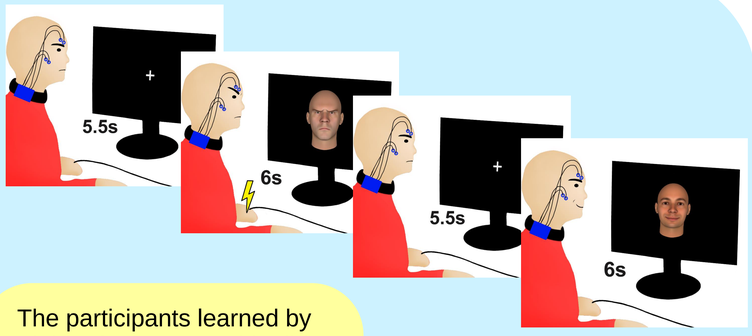


We recorded signals from Corrugator Supercilli and Zygomaticus Major.

EXP. 2



Faces were presented randomly and each face formed a SMILE OR a FROWN upon presentation. Exp 1 had two faces while Exp 2 had four faces.



The participants learned by trial-and-error to avoid mild electric shocks by expressing the same (congruent) or different (incongruent) expression. Each face was assigned congruent or incongruent condition.

	Congruent	Incongruent
Frown	**Frown to frowning face to avoid shock.**	**Frown to smiling face to avoid shock.**
Smile	**Smile to smiling face to avoid shock.**	**Smile to frowning face to avoid shock.**

Main Results

EXP 1. Correct response rate and response time summary

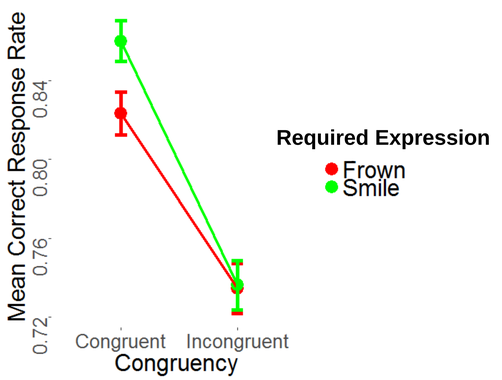


Figure 1. We observed enchanced correct response rate on congruent trials vs. Incongruent trials for exp 1., $z = 3.2$, $p < 0.01$.

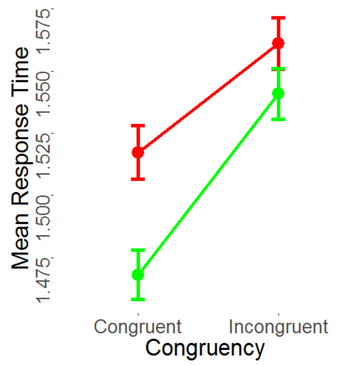


Figure 2. We observed faster response times on congruent trials vs. Incongruent trials for exp 1., $t = 3.2$, $p < 0.01$.

Influence of dominant facial traits on correct response rate and response time from EXP. 2

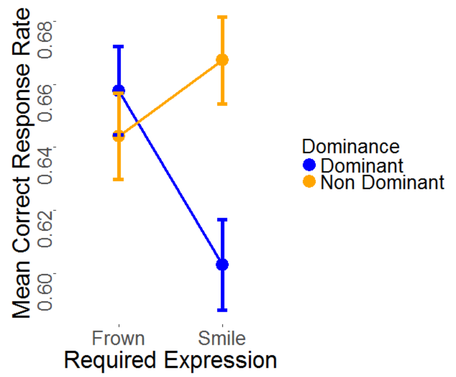


Figure 3. We observed impaired correct response rate at trials with dominant stimuli when the correct answer was to smile, $z = 2.8$, $p < 0.01$.

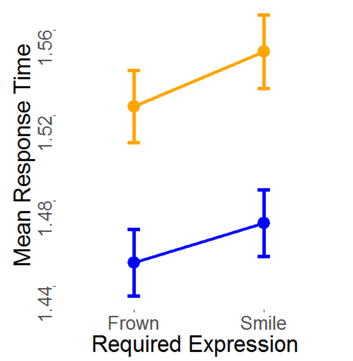


Figure 4. We observed faster response times in trials with dominant stimuli compared to non-dominant stimuli, $t = 2.90$ $p < 0.01$.

Discussion

• We developed a novel method simulating the exchange of facial expressions in interactive dyads.

• Our results suggest that interactive learning of adjusting facial expressions is contingent on congruency, expression and face dominance[2] of the interactive partner.

• Furthermore, participants seem to engage in speed-accuracy trade-off when interacting with dominant faces. This interpretation is based on mixed model regression analysis.

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References

1. Jack, R. E., & Schyns, P. G. (2017). Toward a Social Psychophysics of Face Communication. *Annual Review of Psychology*, *68*(1), 269–297. http://doi.org/10.1146/annurev-psych-010416-044242
2. Oosterhof, N. N., & Todorov, A. (2008). The functional basis of face evaluation. *Proceedings of the National Academy of Sciences*, *105*(32), 11087–11092. http://doi.org/10.1073/pnas.0805664105