interpersonal synchronisation as a mediating mechanism in vicarious fear learning

Philip Pärnamets, Lisa Espinosa & Andreas Olsson
philip.parnamets@ki.se
http://emotionlab.se

background & aims

- vicarious fear learning is crucial survival related adaptation across species [1]
- in humans vicarious learning has been demonstrated, where an observer learns to associate stimuli with shocks by watching a filmed model [2]
- mechanisms facilitating vicarious learning are largely unknown, though previous work has implicated instructed empathy [3]
- interpersonal synchronisation of physiological signals implicated in social cohesion [4] and cooperative outcomes [5]

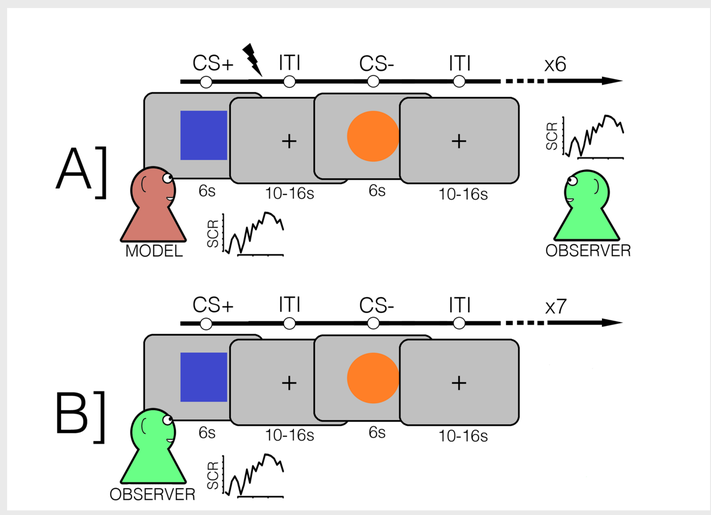
1) can we demonstrate vicarious fear learning in live interacting dyads?
2) does interpersonal physiological synchronisation predict learning outcomes?

method

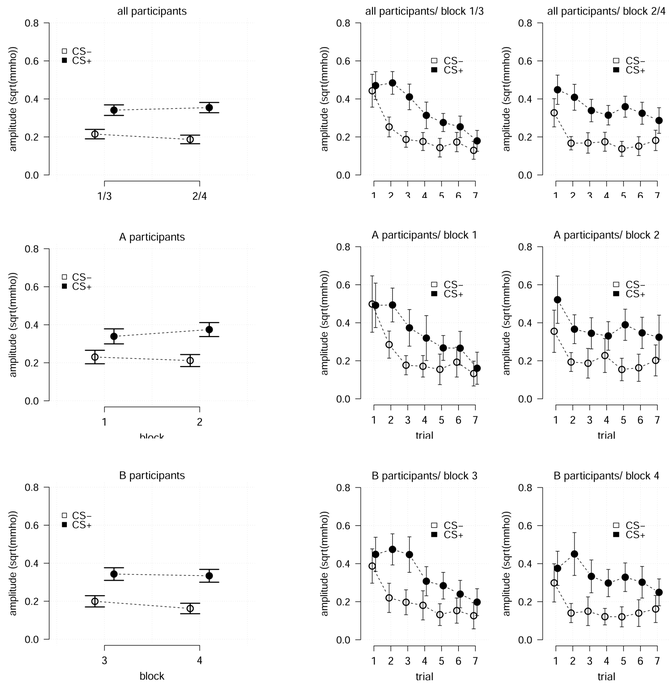
- naïve participants (N=96; 43 dyads) randomly assigned to be either observer or model
- four blocks total, each block consists of learning phase followed by a test phase
- participants switch roles after two blocks
  - "A" participants begin as observer, "B" participants begin as model

A] learning phase
- six 6s presentations of CS+ & CS-
- 10-16s ITI
- skin conductance collected from both participants
- 80% reinforcement rate (shocks) to model only
- observer vicariously attempts to learn stimulus-shock contingencies

B] test phase
- seven 6s presentations of CS+ & CS-
- 10-16s ITI
- skin conductance collected from observer
- no reinforcement following CS+ except on final (7th) trial

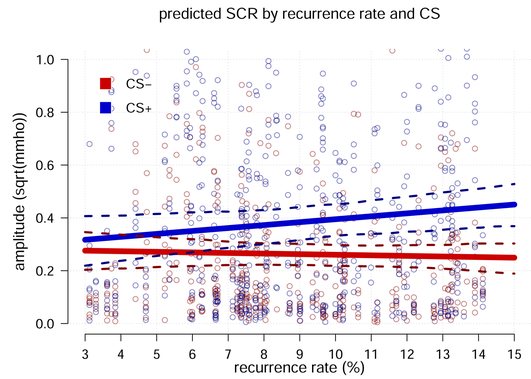


results - learning



results – synchronisation

- cross-recurrence rate calculated between observer and model during learning phase
- significantly predicts strength of CS response
- effect evident for "B" participants



conclusions

- demonstrated vicarious fear learning in naïve participants extending previous findings to more ecologically valid setting
- degree of synchronisation of electro-dermal activity between dyad members during observational learning predicts strength of conditioned fear response
- physiological synchronisation may capture active simulation of model by observer, providing mechanism for empathy mediated learning

References:
[1] Adolphs, R. (2013). *Curr. Bio.* [2] Haaker, J., Golkar, A., Selbing, I. & Olsson, A. (2017). *Nat. Prot.*
[3] Olsson. A. et al. (2016) *Psychol. Sci.* [4] Konvalinka, I. et al. (2011) ´. *Proc. Natl. Acad. Sci.*
[5] Mønster, D. et al. (2016).. *Physiol. Beh.*

Karolinska Institutet