

Research projects in the CoPAN lab

Topic: Trust, eye signals, pupillometry
Supervisor(s): Mariska Kret
Positions: 2
Requirement: -
Starting Date: January 2017, negotiable
Anticipated End: negotiable

Title: How subtle eye signals can promote trust



Description: The ability to trust others is pivotal to social life, e.g. to have positive expectations that sharing emotions with others fosters help and cooperation, not betrayal or exploitation. The assessment of trustworthiness often concerns strangers. Here, trust is intuitive and based on expressions from the face and the eyes. Direct eye contact provides the most powerful mode of sharing subtle expressions. The signals from the eyes include the fine muscle movements around the eyes, gaze direction, pupil size and tears. Dilated pupils can be a sign of social interest (Hess, 1965). In previous research, Kret et al. (2015) observed that when the pupil sizes of two partners dilate synchronously, this promotes trust. Other research has shown that tears can evoke prosocial and helping behavior in others and that small pupils increase the perception of sadness (Harrison, 2006). Here, we would like to disentangle the effects of different eye signals and investigate whether the presence of tears and red sclera modulate the previously observed link between pupil dilation and trust.

Literature: Kret, M.E. (2015). Emotional expressions beyond facial muscle actions. A call for studying autonomic signals and their impact on social perception. *Frontiers in Psychology*, 6, 711.

Kret, M.E. Fischer, A.H. & de Dreu, C.K.W. (2015). Pupil-mimicry correlates with trust in in-group partners with dilating pupils. *Psychological Science*, 26(9), 1401-1410.

Topic: Cooperation, pupillometry, electromyography

Supervisor(s): Friederike Behrens, Mariska Kret

Positions: 2

Requirement: programming/advanced statistics skills are desired, but not mandatory

Starting Date: January 2017, negotiable

Anticipated End: negotiable

Title: Emotional expressions beyond facial muscle actions: A real-life interaction approach

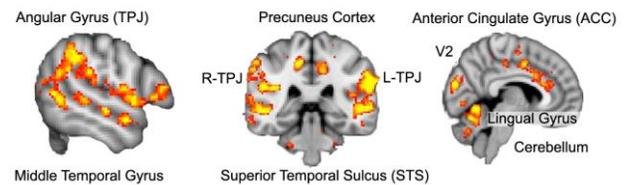


Description: Cooperation is the basis of countless situations from political negotiations in the Syria Civil War to riding a tandem-bike. To communicate our intentions we use a variety of non-verbal signals, ranging from full-blown facial expressions to changes in pupil size. These signals -in all their subtlety- tend to be mimicked, fostering mutual understanding and trust. Hence, they are not only a reflection of our emotions and intentions, but also communicate fostering a social bond with another person. Pupil mimicry is probably the least understood form of mimicry. The pupil provides uncontrollable, yet visible insights into a person's level of arousal and does indeed influence observers' behavior. Studies thus far relied on computer tasks measuring participants' responses to portraits in which the pupil size was manipulated and investigated mimicry in isolation. Although this provided solid experimental control, the settings do not reflect the dynamics during real-life interactions.

Our project therefore aims to i) investigate pupil mimicry in a real-life setting and ii) explore to what extent this phenomenon complements the mimicry of facial expressions and other physiological responses including heart rate and blushing in driving observers' social decisions. We use a diversity of state-of-the-art equipment such as the Tobii Pro Glasses 2 to give precise measures of the pupil size, eye-blinks and eye gaze, and the area a person is looking at. Skills you will develop and improve include preparing and designing experiments, applying and analyzing different physiological measures (e.g., EMG, ECG, and body temperature), and refining your academic writing.

Topic: fMRI, pupil mimicry, trust
Supervisor(s): Eliska Prochazkova & Mariska Kret
Positions: 2
Requirement: FSL, Matlab
Starting Date: negotiable
Anticipated End: negotiable

Title: Individual differences in the linkage between pupil mimicry and trust. An fMRI study.



Description: In order to decide whether to trust someone or not, people generally make eye contact. During this process, the pupils of interacting partners tend to align, aiding this decision. Interestingly, previous research has shown that if both partners' pupils synchronously dilate, pupil-mimicry promotes trust. Preliminary fMRI findings show that the Theory of Mind network is activated when participants pupils mimic their partner's, versus when they do not. Whether this phenomenon is equally prevalent in everybody or whether individual differences in personality and/or physiological arousal modulate these effects is not known.

We have conducted a large fMRI study with 35 participants where we also sampled diverse physiological measures and assessed personality characteristics. In the study, we tested the effect of a (virtual) partner's pupil size changes and own pupillary responses on subject's trust decisions during incentive trust games.

Literature: Kret, M.E. (2015). Emotional expressions beyond facial muscle actions. A call for studying autonomic signals and their impact on social perception. *Frontiers in Psychology*, 6, 711.

Kret, M.E. Fischer, A.H. & de Dreu, C.K.W. (2015). Pupil-mimicry correlates with trust in in-group partners with dilating pupils. *Psychological Science*, 26(9), 1401-1410.

Topic: human-dog co-evolution

Supervisor(s): Mariska Kret

Positions: 2

Requirement: photography and photoshop skills (or high motivation to learn this), affinity with animals

Starting Date: negotiable

Anticipated End: negotiable

Title: Puppy eyes. Effects of human-dog co-evolution on physical and personality characteristics of dogs.



Description: Dogs have been domesticated for tens of thousands of years and have since been partners in humans' evolutionary journey. Since then, domestic dogs' brains and digestive organs have evolved in ways very similar to the organs and brains of humans. Interestingly, their personality and appearance changed too, becoming less aggressive, more communicative and more infantile. A parallel can be drawn here with our own species, which underwent a similar transition compared to the other apes. During this transition, the eyes became more and more prominent, bigger and with more visible eye-white. In humans, the eyes are crucial for communication and infants are already attracted to eyes and follow gaze. Dogs, and some breeds more than others, share some of these communicative characteristics of the human eye. In the current project, I aim to compare the characteristics of the eyes of several breeds of dogs with domesticated wolves and link these to personality characteristics.

The dataset of dogs is completed but I don't have any data from the wolves yet. To that extent, I am looking for a highly motivated master student to 1) shoot close-up pictures of domesticated wolves and specifically from their eyes, 2) perform a behavioral test measuring spontaneous helping behavior 3) obtain personality characteristics via the owner. Next, several measurements of the eyes needs to be taken by using photoshop (i.e., size of the eye compared to the head, presence of eye white, contrast with the skin around it etc. etc.). The student will also be involved in data analyses and writing up the results.

Topic: Comparative psychology, Animal cognition, emotion, attention
Location: Apenheul Zoo in Apeldoorn
Supervisor(s): Evy van Berlo, Mariska Kret
Positions: 5
Requirement: some affinity with children and creative, taking initiative
Starting Date: Spring 2017, negotiable, but the zoo opens in April (preparations can start earlier). It is possible to work on weekends too
Anticipated End: negotiable
Title: The perception of emotional expressions across species



Description: Seeing a conspecific being emotional and expressing that via facial expressions or body language immediately attracts attention and automatically triggers action tendencies in observers (Frijda, 1986). Emotions' potential for action supports an evolutionary account, which assumes that emotions evolved to benefit the organism by responding more adequately to threats in the environment (Nesse, 1990; de Waal, 2011). Indeed, we use another's emotion signals to guide our actions, for example, to initiate an approach reaction towards a happy person, or to avoid someone with an angry expression. And we humans are not unique in that at all (Panksepp, 2005; Frijda, 2016). Even more basic responses, such as fight or flight reactions can be triggered by observing emotional expressions in others (Ohman & Soares, 1993; LeDoux, 1996). A recent study by Kret, Wijnen and de Valk (2015) directly investigated action tendencies towards fearful, angry and neutral facial and bodily expressions. Participants stood in front of a computer-screen and were instructed to tap as fast as they could on emotional expressions that appeared either on the left or on the right side of a touch screen. Results showed an attentional bias towards anger and fear, with faster responses following these as compared to neutral expressions, independent of whether expressed by the face or the body. Thus, emotional body expressions attract attention similarly as emotional facial expressions and facilitate fast actions. The past winter, we conducted a very similar task with bonobos as participants and observed that their attention was mostly driven by positive social behaviors (Kret, Jaasma, Bionda & Wijnen, 2016). This research continues also this winter, and will be expanded to also include orangutans. Importantly, I would like to give visitors of Apenheul the possibility to learn about and participate in scientific research. More specifically, I want to give them the very similar tasks as the apes and investigate the perception of emotions across species. Apenheul has a perfect location for this little science center that I want to create, namely, the Lucy cage. Thus, for this project I am looking for students who want to work in Apenheul zoo and test zoo visitors.

Literature: Kret, M.E., Jaasma, L., Bionda, T., Wijnen, J.G. (2016). Bonobos (*Pan Paniscus*) show an attentional bias towards conspecifics' emotions. *Proceedings of the National Academy of Sciences*, 113(14), 3761–3766.

De Valk, J. M., Wijnen, J. & Kret, M.E.* (2015). Anger fosters action. Fast responses in a motor task involving approach movements towards angry faces and bodies. *Frontiers in Psychology*, 6:1240.

Topic: Art, brain, evolution
Supervisor(s): Mariska Kret and Larissa
Straffon
Positions: 2
Requirement: Eprime programming skills
Starting Date: preferably asap
Anticipated End: 04-01-2017

Title: Art, aesthetics and the evolution of the
social brain



Description: In the current project we investigate the proposition that in the evolution of visual art, the social brain network has been co-opted in aesthetic experience to appraise art.

Research in cognitive neuroscience has shown that people have a preference for familiar faces; their attention is immediately grabbed by seeing someone familiar and this usually leads to more positive affective reactions. Our prediction, derived from the hypothesis that aesthetic experiences derive from social cognition, states that people should show a similar preference for familiarity in art.

To test this hypothesis, participants will be presented with different pieces of art. We will assess the extent to which they are familiar with the artwork and assess liking, understanding, knowing, and judging (e.g. I enjoy looking at visual art; I understand the meaning of art; I am knowledgeable of artists and art styles; I am a good critic of art). Participants will also conduct an implicit task to measure which artworks drive their attention most. Our prediction is to find a preference for familiarity over content or composition. That is, participants should be biased towards artworks to which they are familiar.

In this project, We are looking for highly motivated students with an interest in evolution to think about more details of the experimental design, conduct a lab experiment and analyze the data.