SORTEE: promoting open, reliable, and transparent ecology and evolutionary biology (Poster)

Bawan Amin

Science and society benefit when scientists conduct research in a transparent, reproducible, and collaborative fashion. The Society for Open, Reliable, and Transparent Ecology and Evolutionary biology (SORTEE) was founded in December 2020 with the aim of bringing together researchers working to improve reliability and transparency through cultural and institutional changes in ecology, evolutionary biology, and related fields. SORTEE's goals and philosophy are described in O'Dea et al (2021) Towards open, reliable, and transparent ecology and evolutionary biology BMC Biology 19: 68. In 2021 and 2022, hundreds of researchers became members of SORTEE and participated in the first two editions of the Society's annual virtual conference. This poster will showcase SORTEE's efforts to promote open, reliable, and transparent research practices and its activities and success thus far.

The Dynamic Animal Welfare Concept (DAWCon)

Saskia S. Arndt, Vivian C. Goerlich, F. Josef van der Staay

For properly assessing, safeguarding, and promoting animal welfare, concepts are needed as guidelines. We developed the "Dynamic Animal Welfare Concept" (DAWCon). We argue that positive welfare is reflected by an animal's mental and physical capability and ability to react adequately to lasting or sporadic adverse and appetitive external and internal stimuli, events and conditions. Adequate reactions are elements of an animal's normal behavior, which allow it to cope with and adapt to environmental demands, enabling it to reach a state that it perceives as positive, i.e., that evokes positive emotions. Behavioral studies allow to identify changes in response to changing environmental challenges and are crucial for assessing an animal's welfare state. They allow for discussing consequences of domestication and provide the basis, eventually supplemented with physiological measures, for assessing the significance of abnormal and maladaptive behavior as indices of compromised welfare.

Anti-boredom and birdsong syntax

Gabriël J.L. Beckers, Michiel Vellema

Like human singing, birdsong can have a complex sequence structure. The most investigated hypothesis is that vocal sequence complexity signals fitness of the singer. However, a largely forgotten hypothesis states that vocal sequences are complex so as to be perceptually as exciting as possible, and to prevent loss of attention in listeners. This 'monotony threshold' hypothesis (Hartshorne, 1956) was originally investigated at the behavioral level, but really requires testing at neurophysiological level. Using an advanced intracerebral neuroelectric imaging technique in zebra finches (Taeniopygia guttata), we recorded auditory responses to artificial songs with different syntaxes based on natural vocal elements. We show that complex songs excite auditory systems more strongly and that excitability depends on the time scale over which low-level vocal predictability is minimized. We suggest that birdsong exploits a general auditory bias for short-term novelty in listeners.

Generosity in snow monkeys!

Debottam Bhattacharjee, Eythan Cousin, Lena S. Pflüger, Jorg J.M. Massen

What made humans so generous? Generosity, or broadly, prosociality, is ubiquitous in humans irrespective of geography. Examining the evolution of prosocial acts led biologists to explore various taxa. Evidence suggests that enhanced tolerance and care among individuals facilitate prosociality. Yet the question arises whether societies with 'asymmetry in resource holding power' exhibit prosociality or not. Unfortunately, species with a generally low social tolerance are neglected in prosociality research. Counterintuitively, despotic societies are characterised by kin favouritism and high interdependence, despite low group tolerance. Such complexity may give rise to enhanced dyad-specific tolerance, leading to the emergence of prosociality. We tested Japanese macaques, a despotic species and found evidence of prosociality. Individuals benefitted both kin-relatives and others to whom they showed high tolerance. The study signifies that prosociality can emerge even in a despotic society.

The delayed effect of climatic conditions on pre-fledging nestling haematocrit

Joseph E. Churchill, Martje L.M Birker, Maaike Versteegh,Tomas A. Altamirano, Rodrigo A. Vasquez, Jan Komdeur

Haematocrit, the proportion of blood comprising erythrocytes, is often used as an indirect proxy of fitness in Ornithology. Nestling haematocrit is influenced by several factors but temperature is generally agreed as the key driver. It is unclear which day(s) in embryonic or nestling development are most influential in determining pre-fledging nestling haematocrit.

We looked at the effect of climatic conditions on haematocrit in nestling thorn tailed Rayadito's. We measured nestling haematocrit and used precipitation and ambient temperature data to observe when during embryonic and nestling development these could determine pre-fledgling haematocrit. We found that the late embryonic stage and 2 days after hatching can determine pre-fledgling haematocrit and that the conditions on the day haematocrit is collected is of no importance. This shows that nestlings are physiologically most vulnerable to climate during the late embryonic and at hatching.

Effects of urbanization on early life stages and potential for local adaptation

Andrew D. Cronin, Judith A.H. Smit, Jacintha Ellers, Wouter Halfwerk

Urbanization is rapidly altering landscapes across the globe. Due to these shifting ecological contexts, urban and non-urban populations often differ in a range of morphological and behavioral traits. In species with multiple life stages, early life stages are characterized by high mortality and strong selection, and also likely contribute to phenotypic divergence in adults. Despite possible differences in selection pressures and ramifications for later life stages, the effects of urbanization on larval stages remain largely unknown. We examined morphological and behavioral differences between urban and forest tadpoles in the túngara frog. We transplanted urban and non-urban tadpoles to examine the role of behavioral plasticity in these environments, and test for local adaptation in urban and non-urban populations. Determining how urban conditions affect early life

stages provides a more comprehensive understanding of the implications of urbanization on persistent populations.

Disruption of daily and seasonal rhythms in migrating fish (Poster)

Joke Meijer, Hans Slabbekoorn, Christian Tudorache

Many organisms have adapted to day-night cycles by the evolution of endogenous rhythms regulating most biological processes. The duration and intensity of light during daily and seasonal rhythms maintains the biological clock's "connection" to the external environment, on which fish rely for the functioning of many behavioural and physiological patterns, such as migration. Light pollution can disrupt these rhythms, negatively impacting behaviour and physiology of fish as day-night differences become less discernible, which is especially concerning for migratory fish species. Light pollution may mask the natural cues used for the triggering of and navigation during migration, which can influence energy expenditure and migration success. Using in field and in lab methods we will test fish from light and non-light polluted environments to provide an in-depth overview of the impact of increasing incidences of light pollution on migratory freshwater fish.

A few primate species are prosocial. Do despotic macaques also benefit group members?

E.J.A.M. de Laat

Despotic long-tailed macaques showed only providing of food to others, if they also obtained a reward. We did not expect them to selflessly favour others in a group service task. Do these macaques act prosocial, which characteristics are determinant? We presented a swing to test in three groups (N=4; 9; 19). An animal can pull a rope and take a reward during training and motivational trials, or provide a reward to another when the reward is out of reach to the actor. This was contrasted in trials without rewards and blocked access. Contrary to our expectation, social tolerance in all groups was relatively high. In test trials, several individuals pulled more if others were able to take a reward than in controls. This suggests understanding and prosocial intentions. In each group, different factors were likely to predict prosociality. Long-tailed macaques may be prosocial as a consequence of their eagerness to earn a reward themselves; they tolerate those who they like.

Artificial selection for predation survival shapes life-history traits and collective motion in guppies (Poecilia reticulata)

Hannah De Waele, Regina Vega-Trejo, Kevin Chou, Jori Noordenbos, Alexander Kotrschal

Predation pressure exerts strong selection pressure on many traits. For instance, it is likely a major driver of the evolution of life-history traits and collective behaviour. A wealth of empirical evidence corroborates this idea. However, such data is often derived by comparing natural populations with associated confounding factors inherent to ecological comparisons. Experimental evidence on how predation impacts evolution is surprisingly scarce. Here, we experimentally tested how predation impacts the evolution of life-history traits and collective behaviour in juvenile and adult guppies (Poecilia reticulata). We used three replicate lines of guppies artificially selected for adult predation survival for three generations and compared them to three control lines. We found that predation

selected fish had larger, and more offspring, in particular early in life than controls, while several other traits were remarkably unaffected by selection. Additionally, we found that the offspring

Response triggering potential of different sound stimuli, a basin study using wild-caught herring (Poster)

Fien Demuynck, Jeroen Hubert, Tom van Tilburg, Daniël Mirck, Hans Slabbekoorn

As anthropogenic sound sources increasingly contribute to the underwater soundscape, this can negatively impact these marine animals. Pile driving during the construction of offshore wind farms and detonation of ordinance create high-amplitude, impulsive sound, which can be harmful to nearby fish. However, sound can also be used as a mitigation measure by means of acoustic deterrent devices (ADDs), but we still have little insight into what type of sounds would be most efficient to deter marine fish. In our current study, we played back a set of 8 pulse train sound stimuli, varying in amplitude and temporal pattern, to test for their response triggering potential in Atlantic herring. 18 groups of 4 herring were exposed to each sound stimulus, as well as silence, in a large indoor basin. We recorded individual behaviour and group coherence with underwater cameras and used this to track the fish with dedicated software, yielding 3D positions. The analysis of this data is ongoing.

Bird brains: How do they stop? (Poster)

Anneleen Dewulf, Frederick Verbruggen, Luc Lens, Joah Madden

Response inhibition (RI), the ability to suppress inappropriate actions, is critical for adaptive behavior in ever-changing environments. Because of this, in recent years RI has become a popular topic in the animal cognition field. But within the field, differences in task performance are often ascribed to a single control process, without providing proper mechanistic explanations. I will address this issue during my PhD by combining avian empirical work with theoretical work (across species). I propose that certain core cognitive processes play a role in RI across species. First, I will focus on two fundamental processes at a single trial level; stop-signal detection and action implementation. Next, I will examine whether individuals can learn to stop across trials. Lastly, I will use this newly developed cognitive framework to guide my research on the underlying neurochemical mechanisms. By doing so, I will establish the first coherent neuro-cognitive framework of RI in animals.

Drosophila melanogaster females manipulate sperm allocation based on the sensing of pheromones indicative of male quality.

Nicolas Doubovetzky, Sanne Bal, Jean-Christophe Billeter

In polyandrous species, females can store sperms from different males in their reproductive tract and exert post-mating sexual selection by favoring the sperm of one male over the other, biasing the paternity of their offspring. This process is known as cryptic female choice. In Drosophila melanogaster, females can modulate the timing of sperm ejection depending on their social environment. The mechanisms behind how females regulate timing of sperm ejection and its functional consequences on paternity however remain unclear. To understand how females regulate timing of sperm ejection, we measured the sperm ejection latency of females in different social or

pheromonal context. Using transgenic males expressing fluorescent sperm, we show that twice-mated females can manipulate sperm allocation depending on the quality of the male in their presence after the first mating, affecting the quantity of offspring from the second male.

Context-specific emotional responses in long-tailed macaques (Poster)

Paula Escriche Chova, Debottam Bhattacharjee, Aníta R. Gujónsdóttir, Anne Marijke Schel, Elisabeth H.M. Sterck, Jorg J.M. Massen

Studying animal emotions and how it affects their behavior and physiology can be challenging, however, it is essential for the understanding of animals as well as humans. Animal emotions can be defined as a multidimensional response composed of physiological, behavioural and cognitive reactions to a stimulus or specific situations. The purpose of this study was to investigate animal emotions using a non-invasive multidimensional approach to disentangle the physiological and behavioural emotional reaction towards a potentially dangerous situation. We gathered information from three long-tailed macaque groups , living in their existing social group setting in captivity. The experimental procedure consisted of confronting the groups to two different predator models. Facial temperature and behavior were recorded during the confrontation and after the predator was removed. We discuss the group level responses from the perspective of emotional arousal during predator exposure.

The impact of brood size and quality signals on early sociability (Poster)

Alejandro García-Antón, Jorge García-Campa, Wendt Müller, Judith Morales

A central component of social interactions is the expression of signals of quality. Therefore, it can be expected that the role of signals becomes more relevant in densely populated environments, in which social interactions are more frequent and the degree of conflict is probably stronger. To test this hypothesis, we experimentally blocked the UV/yellow reflectance of breast feathers and brood size as a proxy of social density in the Blue tit, Cyanistes caeruleus. We found that UV-blocked offspring were involved in less interactions that their nonblocked siblings, independently of brood size. Moreover, we detected an overall preference to be in physical contact with siblings of a different UV colour phenotype, which was stronger in small broods. Our results suggest that offspring quality signals can influence the intra-family social structure and that this effect is partly modulated by social density, and, presumably, by the degree of conflict.

Early life abuse and neglect in canaries (Poster)

Clara Garcia-Co, Judith Morales, Frederick Verbruggen, Wendt Müller

Early-life is one of the most critical periods for behavioural and cognitive development. An unfavourable early life environment with inadequate nourishment, deprived of social interactions and parental neglect/abuse may hence result in profound cognitive and behavioural deficiencies. How these effects can be interpreted in a framework of adaptive responses and how natural selection structures developmental effects arising from early life adversity remains unclear. Intriguingly, the parental traits that contribute to early life adversity might even be transmitted across generations ("cycle of violence"). Gaining a better understanding of the relative contribution

of genetic and non-genetic factors in shaping such parental traits is therefore of fundamental relevance. This project investigates how an adverse early social environment has both short- and long-lasting effects on behaviour and cognition, whether these effects are of adaptive significance, and how epigenetic or other non-genetic effects contribute to their transgenerational transmission. A first experiment revealed that experiencing parental abuse during early life has a significant effect on the growth and survival rates in domestic canaries (Serinus canaria). Currently, we are investigating the possible lasting consequences on cognition, behavior and health in order to ultimately link early life experiences with individual life trajectories.

Hot horns - Investigating the possible thermoregulatory function of dairy cattle horns by infrared thermography

Marijke Algra, Lara de Keijzer, Saskia S. Arndt, Frank J.C.M. van Eerdenburg, Vivian C. Goerlich

Horns of dairy cattle are typically removed at young age. Surprisingly little is known about the biological function of horns, and about the potential physiological consequences of horn removal. Anecdotes suggest that horns get warmer during rumination, and studies on other bovid species indicate that horns aid thermoregulation. We performed behavioural observations and measured horn, eye, and ear temperature of 18 focal cows on three different farms, using infrared thermography. The heat load index (HLI) was calculated from environmental temperature, humidity, and wind speed, as measure of the heat load experienced by a cow. The temperature of horns increased with increasing HLI, indicating that horns serve the dissipation of heat. We did not, however, find changes in horn temperature during rumination. Our study thus supports a role of horns in thermoregulation, but not related to rumination. These results should be considered when assessing potential consequences of horn removal.

Investigating the mechanisms underlying the sexual overperception bias (Poster)

Iliana Samara, Tom S. Roth, Mariska E. Kret

A well-known finding is that men overperceive sexual interest in women, which is known as the sexual overperception bias. It has been proposed that the mechanisms underlying this bias are a) projecting one's own interest onto a given partner, b) sexual desire, c) and self-rated attractiveness. Here, we examined whether these factors influence attraction detection accuracy during real-life speed dates (227 dates). We found that sex and projection of own interest predicted attraction detection accuracy. Specifically, men were more accurate in detecting attraction when they were not attracted to their partner compared to when they were, whereas women performed at chance level independent of their attraction to their partner. On the contrary, sexual desire and self-rated attractiveness did not influence attraction detection accuracy.

Mating motivation: the effect of eliminating the male function on sexual behaviour in a simultaneous hermaphrodite

Mona Palmeira, Yumi Nakadera, Joris M. Koene

Male and female motivation to mate can differ due to conflicts over reproductive investment. While relatively straight-forward in separate-sexed species, motivations become intertwined in

simultaneous hermaphrodites, because they are both sperm donor and receiver. For the hermaphroditic snail Lymnaea stagnalis, male motivation becomes temporarily low after having donated sperm. Moreover, being inseminated involves costs imposed by seminal fluid proteins and sperm recipients exhibit behaviours that may discourage insemination. We tested experimentally whether these behaviours are female-motivated by eliminating the male role using a surgical procedure. Crawl-out was not affected, but Biting decreased in feminized individuals. Biting, previously proposed as a female behaviour, thus seems male motivated. This experimental approach enabled us to disentangle sexual motivations of a simultaneous hermaphrodite.

Impact of environmental factors on calling behavior in midshipman fish across ocean basins

Annebelle C.M. Kok, Ella B. Kim, Timothy J. Rowell, Tetyana Margolina, John E. Joseph, Lindsey Peavey Reeves, Leila T. Hatch, Simone Baumann-Pickering

Chorusing is widespread across the animal kingdom. Many fish call in choruses to attract mates, but the dynamics that drive fish calling behavior have rarely been studied in the field. We investigated how seasonality, lunar period, and temperature influenced the calling behavior of two species of toadfish, the plainfin midshipman (Porichthys notatus) and the Atlantic midshipman (Porichthys plectrodon). Acoustic recordings from a two-year period in 8 different locations, spanning two ocean basins showed that midshipman chorus presence was driven by seasonality and lunar period. Furthermore, chorus frequency increased with increasing temperature. Taken together, these results indicate that midshipman calling behavior is influenced by interacting environmental conditions. By understanding the various impacts of environmental drivers, we may in the future be able to predict how midshipman calling could be affected by the current changes in water temperature and marine ambient noise levels.

Insights from the judgment bias paradigm: Guppies are resilient to standard laboratory housing conditions.

Judith Epping, Alexander Kotrschal, Séverine Denise Kotrschal

Resilience is crucial for captive animal's welfare, and it can be determined via physiological indicators of stress or more holistically via assessment of mental state. An animal's mental state - where it is positioned on the continuum between optimistic and pessimistic state - can be assessed using the judgment bias paradigm. In this test, individuals are trained to distinguish a rewarded from an unrewarded cue before being presented an ambiguous, intermediate cue. The response time to the ambiguous cue is then indicative of mental state. Here, we used the judgment bias paradigm to assess the impact of standard laboratory housing conditions on the mental states of female (Poecilia reticulata). After keeping animals for three weeks in small or large social groups in small or large tanks we found no differences in mental state. Guppies seem relatively resilient to variation in standard laboratory housing and that the judgment bias paradigm can be a useful tool to assess fish welfare.

The social interactions of three-spined sticklebacks – a mesocosm experiment (Poster)

L. M. Leenheer, J. Gismann, F. J. Weissing, M. Nicolaus

The social connections of animals can have crucial consequences for their fitness. In fish, the factors driving shoaling behaviour and social decisions have received ample attention in literature. However, it often remains unclear whether the results can be reliably extrapolated to more complex situations. Therefore, we investigated how two important factors influencing shoaling behaviour – predation threat and rearing density – work in tandem on three-spined stickleback (Gasterosteus aculeatus) sociality in a semi-natural setting. In a factorial common garden experiment, we introduced PIT (passive integrated transponder) tagged fish from different treatments into a system of artificial ponds, allowing us to track the interactions of freely associating individuals. We will present the first results of this mesocosm experiment, which should increase our understanding of the drivers behind social interactions.

Aggressive alarming: Territorial responses of magpies to the alarm calls of conspecifics (Poster)

Arnout Lindeman, Miriam Kuspiel, Sjouke A. Kingma, Marc Naguib, Kat Bebbington

Alarm calls are used in species to warn conspecifics or to address intruders. The type of alarm call has been shown to specifically communicate the threat type in many species, but in others the call types are actually general across contexts. This leaves the question whether variation in the call can still be informative about the context. Alarm calls of Eurasian magpies appear to be the same in different contexts, as they are used against both predators and conspecifics, but we found that the calls vary greatly in duration. We hypothesise that this variation, rather than the call type, reflects the arousal of the caller or the urgency to respond. We will present whether magpies responded more strongly to playbacks of longer call duration or a higher call rate, and may thus perceive higher intensity calls as being more urgent. This will reveal whether variation within a call type can be as important as a referential alarm signal with distinct call types.

The soft and social song of zebra finches in the wild

Hugo Loning, Simon C Griffith, Marc Naguib

Male songbirds sing to establish territories and to attract mates. However, increasing reports of singing in non-reproductive contexts and by females show that song use is more diverse than previously considered. In zebra finches (Taeniopygia guttata), males are not territorial, and pairs form long-term monogamous bonds early in life, so conventional theory predicts that zebra finches should not sing much at all; yet they do and their song is the focus of hundreds of lab-based studies. We here studied zebra finches in a wild population in Australia. We combined multiple observational and experimental methods to characterise various aspects of their song ecology in several years during a successful breeding episode and a severe drought. We show that the social context of wild zebra finch song is integral to their song ecology and that it is not linked primarily to breeding and mate choice but also various other social activities. We discuss which potential functions this may indicate.

Sleep deprivation by artificial light at night impairs cognitive performance in great tits

Marjolein Meijdam, Wendt Müller, Marcel Eens

Sleep deprivation has many adverse effects and is particularly known to impair cognitive performance in humans. However, there is still much uncertainty as to how universal this reduction in cognitive performance caused by sleep deprivation is among animal species, since almost all research on the effects of sleep deprivation on cognition is performed on humans and a few other mammal species. However better knowledge of the consequences of sleep loss becomes increasingly important, as artificial light at night disrupts sleep, not only in humans but also in birds. Therefore, we performed a sleep deprivation experiment to investigate the effects of artificial light at night on inhibitory control and vigilance in wild great tits.

Stopover decisions of migrating white stork (Ciconia ciconia) in Egypt - the role of sewage ponds (Poster)

Khaled Noby, Elke Molenaar, Marc Naguib

Long-distance migrants, such as white storks (Ciconia ciconia), make crucial decisions along the way between their breeding grounds. Habitat selection during stopovers are crucial to rest and refuel and it can therefore be expected to have strong fitness effects. Since the use of stopover sites can vary drastically over time and in space, it is important to identify those sites. From multiple areas throughout Europe, observations indicate that white stork make frequent use of garbage dumps and wastewater treatment plants (WWTPs), which can have both positive and negative effects on individuals. Yet, this phenomenon has barely been studied in arid areas along migratory routes such as in Egypt, where sewage ponds can be the only freshwater source. Thus, here we show results of GPS-tracking data from migratory storks, which we used to identify stopover sites along with satellite image analyses of landscape characteristics and proximity to WWTPs.

Does sex affect long-term memory formation? - A case study in a simultaneous hermaphroditic snail species (Poster)

Yumi Nakadera, Beatriz Álvarez Díaz, Joris M. Koene

Mating has been shown to enhance long-term memory formation in female Drosophila melanogaster, via Seminal Fluid Proteins (SFPs). However, it remains to be tested whether this effect is universal and sex-specific. Here, we tested if mating enhances long-term memory formation in a pond snail species, Lymnaea stagnalis. This simultaneous hermaphrodite is a well-established model species for operant conditioning of air-breathing behaviour. In this experiment, we let the snails copulate, and subsequently operant-conditioned the male- and female-mated individuals to test for any difference in long-term memory formation. Compared to the non-copulating control snails, we did not detect any difference in long-term memory formation in male- or female-mated snails. These findings indicate that the effect of mating, probably mediated by SFPs, on memory formation is not universal, and inspires further investigation to reveal the relationship between copulation and memory formation.

The relative salience of Spectral features and Duration in zebra finch's song discrimination

Zhi-Yuan Ning, Harald G J van Mil, Henkjan Honing, Carel ten Cate

Zebra finches are assumed to have a high sensitivity for fine spectral features of songs but not for temporal features, based on studies comparing discrimination among songs of similar duration. However, there's also evidence that the features to which zebra finches attend when identifying or discriminating songs are not fixed and may depend on the characteristics of the stimuli. In this study, we examine whether the relative importance of spectral and temporal features in song discrimination depends on whether songs differ in duration. After being trained to discriminate two songs, either of the same or of different duration in a Go-left/Go-right task, all birds (of two experimental groups) were tested with various modifications of training songs that were modified in tempo or in spectral parameters. Our results demonstrated that birds' attention shifting from spectral features to song duration when the relative contribution of temporal information increases in song discrimination.

Dogs' understanding of human knowledge in an unsolvable puzzle task (Poster)

Jori Noordenbos

Domestic dogs (Canis familiaris) seem to understand others' visual perspective, but not much is known about their understanding of others' knowledge. We aim to test if dogs differentiate between persons with relevant knowledge and those without, based on who dogs look at for help in an 'unsolvable puzzle' set-up. Dogs learned to solve different puzzles to access food rewards, each prepared and presented by an experimenter or the dog's owner. Only the preparer saw the puzzle throughout and thus possessed knowledge about it. Dogs participated in two trials, with the preparer and puzzle randomly assigned per trial. Each trial the puzzle was made unsolvable and the dog was observed for help seeking behaviour. We expected dogs to look at the preparer for help if they understood that he/she had specific knowledge about the puzzle. Preliminary data of this ongoing study (29 trials) shows that the dogs' first gaze went to the preparer of the puzzle more often than to the ignorant person, irrespective of who the preparer was. Dogs looked longer at the preparer when it was their owner rather than the researcher. This suggests an understanding of knowledge in the preparer, yet a preference for looking at the owner.

What is Social Competence? How Cognition May Underlie Social Competence in a Cooperatively Breeding Cichlid (Poster)

Elizabeth Phillips, Puck Heijmink, Hayo Nadema, Alexander Kotrschal

Social competence is the ability to recognize and adaptively respond to the social environment. Understanding and navigating the social environment is especially crucial for animals who's survival depends on membership in a social group. However, it is not known how individuals attain social competence. We propose that cognition may be key. Better cognitive abilities may allow animals to more easily learn social cues and how to adaptively respond to them, as well as improve their memory of learned social behaviors. To test this theory, we are conducting a series of cognitive tests on cooperatively-breeding cichlids (Neolamprologus pulcher) that have been reared in conditions designed to either promote high or low social competence. However, in contrast to our predictions, we have so far found no differences in innovative and learning abilities between fish with high and low social competence. This indicates that social competence may be mediated by other factors than cognition.

How rats use different types of ultrasonic vocalisations during playful human-rat interactions

Quanxiao Liu, Tereza Ilíková, Mariia Radchenko, Marek Špinka

Young animal play is a lovely sight and the function of play has intrigued many scientists. Rats are widely used as a model species to study animal play. However, it is difficult to quantify how rats play as they often play in the darkness and their play behaviour shares similar kinetic complements with fighting and mating. When rats playfully interact with other rats or humans, they emit several ultrasonic vocalisations (USVs). These USVs can be detected in the darkness and are easy to quantify, therefore, can be used as a proxy for play behaviour in rats. However, there lacks a quantitative description of how rats use different types of USVs and it is also unclear if there are individual differences. To answer these questions, we recorded tickled rats on video and audio, and developed an automatic solution to detect and extract USVs to provide a quantitative description of USVs usage in rats. We also examined individual differences in USVs emission.

Attentional bias towards flanged males in Bornean orangutans (Pongo pygmaeus)

Tom Roth, Evy van Berlo, Thomas Bionda, Mariska Kret

Sexual dimorphic facial characteristics affect social cognition across species: both humans and macaques show an attentional bias towards more dimorphic opposite-sex faces. Orangutans are characterised by male bimaturism: flanged males have a larger body, a throat sack, and flanges on the side of the face, while unflanged males look similar to females. The presence of flanges provides relevant information for other orangutans. Females prefer to mate with flanged males around ovulation, so attending towards flanged males might be important for their reproductive success. For males, flanged conspecifics might pose a threat, resulting in vigilance. To test whether the presence of flanges affected attention, we performed an eye-tracking study with four zoo-housed Bornean orangutans in Apenheul Primate Park. In two experiments, we found that orangutans attended more to flanged males. Furthermore, we explored whether orangutans had biases for specific individuals.

Background complexity and its role on community-level camouflage

Zeke Rowe, Wouter Halfwerk

Camouflage is widespread within the animal kingdom, and has long been studied within biology, most notably by Wallace and Darwin who used key examples to illustrate their ideas of adaptation and natural selection. Since then, the mechanisms of camouflage have been well explored, however only on a species level. Ecological communities typically consist of hundreds of species that interact in many intricate ways, meaning they are complicated to understand. Focusing on camouflage traits in Lepidoptera, I aim to develop a quantitative framework to study predator-prey interactions of whole communities, allowing larger colouration questions to be addressed. Here, I outline the plans and show some prelimanary data from my PhD, looking at camouflage traits in forested vs open habitats and their links to visual predation. Using data from my MSc on selection in the field, I will

argue that habitats with higher visual complexity aid in concealing targets, thereby selecting for more camouflaged species in the community.

The effects of urbanization on male-male vocal interactions and mate choice

Judith A.H. Smit, Vera Thijssen, Andrew D. Cronin, Wouter Halfwerk

Sexual communication is shaped by both signalers and receivers, as well as by the environmental conditions under which sexual signaling takes place. Urbanization drastically changes environmental conditions, including by introducing artificial light at night and anthropogenic noise. Although sexual communication often involves interactions, the effects of urbanization on rival interactions and their consequences for mate choice remains understudied. Therefore, we investigated how urban sensory conditions affect vocal interactions between male túngara frogs (Engystomops pustulosus) by recording dyadic interactions under different light and noise levels. Next, we conducted phonotaxis experiments with females to investigate the consequences of urban altered vocal interactions on mate choice. By incorporating the social dynamics of sexual signaling, our findings provide a more comprehensive understanding of the effects of urbanization on sexual signaling and its fitness consequences.

Free Massive Open Online Courses (MOOCs) in Animal Behaviour (Poster)

Lysanne Snijders

Massive Open Online Courses (MOOCs) are free online courses available for anyone. MOOCs provide an affordable and flexible way to gain knowledge and learn new skills. The Behavioural Ecology Group of Wageningen University developed two animal behaviour-related courses shared on the EdX platform. In 2016, we released the first course, 'Introduction to Animal Behaviour', with more than 50000 people enrolled thus far. It also made the Class Central 'Best of all time' list for MOOCs. In this course, you can learn about the fascinating range and complexity of animal behaviour as well as the scientific method to study behaviour. In November 2022, we will release our second course, 'Animal Behaviour in Conservation'. This course helps you take the animal behaviour perspective in major conservation challenges, such as environmental change, human-wildlife conflict and wildlife reintroductions. You will learn about successful examples of behaviour-based conservation management and work on your o

When the Peter Pan ape grows up: Age-related changes in aggressive and sexual behavior of bonobos (Poster)

Nicky Staes, Verena Behringer, Daan W. Laméris, Edwin J.C. van Leeuwen, Jonas Verspeek, Marcel Eens, Jeroen M.G. Stevens

Bonobos are often portrayed as juvenilized apes due to their reputed peaceful and highly sexual nature that lasts throughout adulthood. However, studies investigating the ontogeny of bonobo behavior often rely on relatively small sample sizes of rather young individuals, housed in single groups. While many studies consider bonobos adult as soon as they reach reproductive age between 7-12 years old, physiological markers of growth suggest that bonobos reach somatic adulthood years later, a trait that could be reflected in their behavior. To investigate the effects of age on bonobo

behavior, we analyze age-related changes in aggressive and sociosexual behavior in a large cross-sectional sample of 64 bonobos housed in six zoos, ranging in age from 0.5 to 61 years. Our results show that sociosexual behavior peaks in adolescence as soon as sexual maturity is reached around 12 years old after which it declines again to plateau around age 30. Levels of aggression given do not peak until years

Soundscape orientation potential in river habitats to migratory fish

Kees te Velde, Hans Slabbekoorn

Migratory fish populations are among the most endangered in the world. This can be attributed to multiple stressors, and worldwide, many of these are being tackled in restoration efforts. However, the impact of anthropogenic noise and soundscape deterioration in river habitats remains largely overlooked. Fish can be disturbed, deterred, and masked by elevated sound levels and use acoustic information in orientation and navigation. Noisy human activities may therefore affect migratory tendency and ability.

We investigated soundscape characteristics of lowland river habitats, and urban vs rural river areas. We found considerable spatial and temporal variation among sites related to physical properties of the local river, suggesting that river habitats have distinct acoustic signatures. We also found that urbanized areas have elevated underwater sound levels compared to rural areas, and there are distinct diurnal patterns in anthropogenic noise and aquatic invertebrate vocal activity.

Roost rotator, A new method for sleep deprivation in birds: no evidence for elevated stress

Sita M. ter Haar, Susanne Kirchoff, Vivian C. Goerlich, Gabriel J.L. Beckers

Sleep is important for development, learning, health and stress reduction in humans and other mammals. Studies on mammals, often using sleep deprivation paradigms, have revealed the mechanism behind many of these processes. However, in birds relatively little is known on sleep disruption, while this could be relevant from evolutionary and mechanistic perspectives (e.g. birdsong learning, migration). There are few studies on sleep disruption in birds and they show mixed results. We designed a new sleep deprivation device for birds, and tested it on adult and juvenile zebra finches (Taeniopygia guttata). We found at least partial deprivation by measuring the time the birds keep their eyes open. We found no evidence for a change in faecal corticosterone levels after sleep disruption or yoked control (same activity no SD). This may indicate low effects of sleep disruption on stress in the birds, which potentially facilitates disentangling stress from cognitive effects of sleep deprivation.

Stopping behaviour in two gull species: factors influencing how individuals respond to changes in their environment

Camille A Troisi, Alizée Vernouillet, Reinoud Allaert, Sophia Knoch, Luc Lens, Frederick Verbruggen

There is much variation in how individuals inhibit responses to changes in their environment. Using three different tasks (detour, thwarting, stop-change) we investigated how ecological and intrinsic

factors contribute to such differences during early life. We raised 120 herring (Larus argentatus) and lesser black-backed gulls (L. fuscus) in predictable and unpredictable environments. We found that lesser black-backed gulls were faster in stopping an inappropriate behaviour in the detour task (but not in other tasks) compared to herring gulls. General activity rather than learning seems to underlie this difference. This highlights the importance of understanding the role of non-cognitive mechanisms when measuring response inhibition. The results also suggest that despite being closely related, key species differences in life-history strategies may have led to the evolution of specific cognitive strategies to deal with the challenges gulls face in their environments.

Cognitive and behavioural determinants of innovativeness (Poster)

Utku Urhan, Anders Brodin, Kees van Oers

Behavioural innovation allows animals to invent plastic behavioural responses to novel ecological challenges. Although studies on innovativeness have indicated its importance for adaptation and fitness, it is still largely unclear why some animals are better capable of coming up with solutions to novel problems compared to others. We tested the hypothesis that a combination of correlated cognitive and behavioural specialisations that have evolved for specific purposes other than innovation ability per se, act together to allow animals to innovate. We determined executive functions (motor inhibition, reversal learning) and object permanence as likely cognitive traits, and exploratory behaviour, neophobia and motivation as likely behavioural traits to effect innovative problem solving performance. We tested this in 3 species from Paridae family that differ in niche specialisation. We expect variation in problem solving performance between these species due to their niche specialisation.

Agent Based Model of observational and emotional learning processes in groups suffering disturbances - Is adapting behaviour always better? (Poster)

J. Fransje van Weerden

An ABM model to simulate a group of foragers under predation - with low cognition, recognizing others as being in a similar situation, but not as individuals - makes it necessary to think hard about the assumptions used, especially when the model is a general model for a wide variety of species. Detection of a disturbance will always be some sigmoid, and sudden fleeing behaviour in one individual causes a contagious flee in others that noticed it. When environment is more complex (innocuous disturbances), common forms of adapting behaviour are added: experience gain or a change in fear levels for a recognized pattern. The initial setting for fear levels represent a group with a history being dumped in a new environment with predators and passersby, simulating what happens to groups with(out) these adapting behaviours, in the short term in adapting to rapid changes in ecology, or in the long term. This model gives rise to testable predictions for empirical observations and vice versa.

The seasonal mind: Testing the cognitive abilities of stickleback in the wild (Poster)

Laura Verbeek, Reindert Nijland, Alexander Kotrschal

Animals vary substantially in cognitive abilities, and it is increasingly evident that predation pressure is key in cognitive evolution. Cognitive studies are typically done in captive environments but removing an animal from the wild may obscure its true capabilities. We recently started to remedy this by investigating cognitive performance of guppies in their natural habitat. However, while it is likely that seasonal changes exert a range of different selection pressures, it remains enigmatic how predation impacts cognitive evolution in temperate regions. We will repeatedly test cognitive performance of nine-spined stickleback in their natural habitat and relate it to seasonal changes in predatory community in several replicated ponds. We will assess predator community (fish, bird, insect predators) using environmental DNA. This project will allow for novel insights into how cognition evolves in seasonal environments and we are eager to discuss our plans with the community.

Arthropods as vertebrate brood predators: a review of current knowledge

M.G.W. Verheij, F.C.R. Cunha

Brood predation is a major cause of reproductive failure in vertebrates, and is often credited to vertebrate predators. Meanwhile, the role of arthropods has been largely ignored. To explore this relationship, we compiled observations and conducted a literature review. Additionally, since a predator‘s size is an important predictor of its prey-size range, we examined the body size relationship of arthropod brood predators and their vertebrate prey, as well as the effect of eusociality on prey size. Our findings suggest that arthropod-vertebrate brood predation is both geographically and taxonomically widespread. Furthermore, we found that solitary arthropods primarily prey on vertebrates of lower mass compared to eusocial arthropods that prey on a wider range of heavier vertebrates. Further research is needed to increase our understanding of the fitness consequences for prey species, which should offer novel perspectives into the evolution of vertebrate anti-predator strategies.

Telomeres and jackdaw life histories

Simon Verhulst, Christina Bauch, Jelle Boonekamp, Ellis Mulder

Senescence is (almost) ubiquitous but the underlying mechanisms remain an enigma. Telomere length predicts survival in many species (including jackdaws) and we tested the hypothesis that experimentally accelerated senescence is mediated by accelerated telomere shortening. We manipulated life histories by manipulating brood size, with individuals manipulated in the same direction every year of their life. Mortality increased faster with age in birds rearing enlarged broods, but brood size manipulation did not affect telomere shortening rate. We conclude therefore that the experimental effect on the rate of senescence was unrelated to telomere dynamics. Age-dependent telomere length rank is largely set at birth and maintained for life. Thus, a better understanding of the causes of early life telomere length variation may help understand the causes of individual variation in life span. Animal models revealed heritability of telomere length to be high (74%), but whether the association bet

Response inhibition learning and the effect of social group size in Japanese quail (Poster)

Kathryn Willcox, Alizée Vernouillet, Frederick Verbruggen, Luc Lens.

In novel situations, animals may need to learn to inhibit inappropriate impulsive actions. Response inhibition (RI) abilities are thought to be affected by early-life experiences; the social environment is expected to be particularly important as inhibition is often required in interactions. However, evidence of a causal relationship between early-life social environment and RI is limited, and RI learning is rarely explored. Here, we used Japanese quails to assess the impact of early-life social group size on the development of RI. We raised birds in small groups of 5 and large groups of 15, and assessed their RI learning in a transparent cylinder task. Quails were able to learn to inhibit their responses across 10 trials. No effect of group size on RI was found, but birds from small groups were less likely to interact with the task. These results indicate that quails are able to rapidly learn to inhibit their responses in a novel situation, but here RI was unaffected by group size.