



Program

Second (and hopefully last) Virtual Conference of the Ethologische Gesellschaft e.V.

February 25th, 2022, 13:00 -18:00CET

Session I (Chair: Erica van de Waal)

13:05 Reproductive senescence in wild and captive Malagasy primates

Leonie Pethig, **Lea Prox**, Claudia Fichtel and Peter Kappeler
German Primate Center

Talk In several mammalian species, individuals show a decline in reproductive output towards the end of their life. In humans and some cetaceans, we even observe an extreme form of reproductive aging where female reproduction ceases years or even decades before they reach their average life expectancy. To date, the evolution of menopause, and why we find it in some species but not in others, remains poorly understood. Comparative data from other long-lived mammals may contribute to a more comprehensive understanding, but data from wild primates, in particular, are scarce. We therefore investigated age-related female reproductive performance in wild redfronted lemurs (*Eulemur rufifrons*), which have an expected longevity of about 20 years. Based on 25 years of long-term data, we have information on reproductive output of 44 females, which we compare to data from 11 captive *Eulemur* species. This data set enabled us to assess reproductive senescence in these primates as well as potential effects of ecological factors. Because the likelihood of reproduction may also depend on intrasexual competition and group size, we also examined the effects of social factors on reproductive rates. Our analyses revealed a decline in reproductive rates with age, but only in captive animals, who also live much longer than their wild relatives. Further, redfronted lemurs are more likely to give birth to an offspring when more females are present. Thus, reproductive senescence is only found among the oldest captive females, which may represent an artefact of captivity, but reproductive tactics are sensitive to the social context.

13:15 Do female reproductive strategies drive cycle and swelling duration in chacma baboons?

Fragkiskos Darmis, Élise Huchard, Guy Cowlshaw and Alecia Carter
University College London

Talk Recent research in social mammals has revealed the complexity of female counter-strategies in response to reproductive competition and sexual conflict. Comparative research has shown that the length of female receptive periods varies with infanticide risk across species, but whether individuals can strategically adjust the length of their receptivity in response to the social context remains unknown. This study addresses this gap and explores if female baboons can modulate their receptivity to reduce aggression rates from competitors and access their preferred male. We predicted that females could (a) shorten their receptive period to reduce aggression from conspecifics, (b) increase their receptive period to decrease aggression and simultaneously access their preferred male or (c) prolong their receptive period to mate with their preferred or (d) with multiple males. We quantified 167 cycles from 55 wild chacma baboons from 2005 to 2019 at the Tsaobis Baboon Project. We found that swelling and maximal swelling duration were shortened when there were more pregnant conspecifics. Since pregnant females frequently

harass receptive ones to reduce their interactions with their offspring's sires, this finding provides support for cycle manipulation by oestrous females aimed at minimizing aggression received in a context of reproductive competition for paternal care. Additionally, swelling length increased as more females were simultaneously maximally swollen and as sex-ratio became more male-biased. These results probably show that receptive females elongate their receptive period in an attempt to minimize infanticide risk by increasing the mating probability with their preferred, mainly the dominant, male. Our findings suggest a further mechanism—cycle manipulation—that could be under selection.

13:25 Long-term effect of noise pollution on the onset of avian dawn chorus: a natural experiment facilitated by the closure of an international airport

Léna de Framond and Brumm Henrik

Max Planck Institute for Ornithology

Talk Cities are particularly interesting for behavioural ecologists because they can be used as natural laboratories in which to study plasticity and adaptation of animal behaviour. The effects of noise pollution on birdsong have been extensively investigated but potential long-term effects are neglected. Near airports, where noise levels are incredibly high, birds start singing earlier in the morning, probably to gain more time of uninterrupted singing before air traffic sets in. In a previous study we documented the noise-related shift of the avian dawn chorus in the vicinity of Berlin Tegel airport. In November 2020 Tegel airport closed, which gave us the unique chance to study the long-term effects of anthropogenic noise, which may also give insight into the mechanism underlying the advancement of dawn singing. To this end, we recorded the dawn chorus in a forest at the now closed airport and in a control forest that was unaffected by aircraft noise, and compared song onsets with the period when the airport was still operating. We found that species responded differently to the cessation of the noise: Some had now similar schedules in both forests, suggesting plastic adaptation, whereas others still sang earlier near the closed airport, suggesting selection for early singing males. Our findings indicate that both rapid individual adjustments and population-wide long-term changes may, in the long run, generate the same behavioural response to anthropogenic change in different species. Concluding, our study revealed long-term effects of anthropogenic noise on animal behavior even after noise emissions had stopped.

13:35 Precopulatory mate guarding in the lekking lesser wax moth *Achroia grisella* – Effects of nighttime perception

Selina Gerdes and Tim Schmoll

Evolutionary Biology, Bielefeld University

Talk In the bee-parasitic lesser wax moth *Achroia grisella* males gather in leks around beehives at night, attracting females through long-range pheromonal signaling and competing for mates via short-range ultrasounds through wing-fanning. When offered a second female in immediate succession after successfully concluding their first copulation of a night, males usually quickly engage in a second copulation, lasting considerably longer than first copulations (hours versus minutes). One possible explanation for these prolonged copulation durations is a function known as precopulatory mate guarding. This behavior allows the male to ensure another copulation and monopolize the female by engaging in copulation posture while producing a new spermatophore. Previous work has shown mate guarding to be a strongly age-dependent behavior with copulation durations increasing with male age. Studies have also shown *A. grisella* males to decrease wing-fanning activity in late phases of the night and ultimately ceasing signaling during the photophase. Copulation behavior may possibly also change in response to nighttime. Based on 58

replicates, we therefore tested whether males that are presented with two females in rapid succession late at night engage at all in i) virgin copulations and ii) follow-up second copulations; and if they do whether they iii) engage in mate-guarding shorter than males presented with females early in the night, to possibly avoid predation risk after daybreak. Moreover, we investigated whether previous observations regarding changes in wing-fanning activity in relation to nighttime can be reproduced.

13:45 **Effects of inbreeding on sperm production and courtship vocalizations of wild-derived house mice**

Doris Nicolakis, Maria Adelaide Marconi, Kerstin E. Auer, Dustin J. Penn and Sarah M. Zala
Konrad Lorenz Institute of Ethology and University of Veterinary Medicine Vienna

Talk Inbreeding increases the expression of recessive, deleterious mutations and has been shown to reduce sperm concentration or seminal quality in several species. Inbreeding can also alter courtship vocalizations, suggesting that such sexual signals may provide reliable indicators of male fertility and genetic quality. The aim of our study was to experimentally manipulate inbreeding in wild house mice (*Mus musculus musculus*) and test the subsequent effects on male sperm production and emission of courtship ultrasonic vocalizations (USV) compared to outbred controls. We recorded outbred and inbred males (n=63) during interactions with a female, and analysed their USV emission and call structure, and then we measured the males' sperm quantity, quality, and longevity. We found a significant reduction in sperm quantity and quality, as well as in the relative mass of reproductive organs after two generations of inbreeding; however, we found no effects of inbreeding on USV emission. Our study provides experimental evidence that inbreeding reduces male sperm production in house mice, but not their emission of courtship USVs. Thus, male ultrasonic vocalizations do not provide a reliable signal of male inbreeding status (mutational load) or sperm quality, at least under laboratory conditions.

13:55 **Long term effects of sterilization on social behaviors of free-ranging dogs in India**

Rituparna Sonowal and Anindita Bhadra
Indian Institute of Science Education Research

Slam Free-ranging dogs are found in most of the developing countries, living close to human settlements and without their direct supervision (Cafazzo et al., 2010). They are primarily a scavenger, scavenging for food in dustbins/dump-pits. These dogs partially depend on humans for their sustenance, but their activities are not directly controlled by human beings (Sen Majumder et al., 2014; Bhadra et al., 2016; Paul et al., 2016).

In India, they are found both in rural and urban settlements. Free-ranging dogs are highly social groups, form long-term social bonds within groups, and showcase different social interactions to live as stable groups.

The free-ranging dog population receives positive (food, social petting) and negative human interactions (beating, harassment, and even poisoning). Therefore, these dogs are engaged in conflict situations with humans in many dimensions (Vanak and Gompper, 2009; Gompper, 2015). These lifetime experiences may vary and can have a significant impact on the social behaviors of dogs.

In 1974, Feldman defined the "problem of urban dogs" as cost, disease, and pollution."

These dogs roam the streets freely and cause road accidents, creating a nuisance by garbage spillage or incessant barking during night times. They are considered reservoirs of various zoonotic diseases, including rabies, and therefore are a threat to both humans and wildlife (Butler et al., 2004; Fekadu, 1982). As a result, humans, with whom they share space and an ecological niche in urban and suburban habitats, have often voiced opinions against the increasing population of stray dogs in public areas.

Population control and management of free-roaming dogs have become very important, especially in developing countries. Animal Birth Control measures have been adopted as only the legal method of population control of stray animals in India via the **Catch-Neuter-Release** Program. The Government of India mandates sterilization and immunization programs **through the Animal Welfare Board of India**. Now, with time, humans are actively taking part in sterilizing such a population of free-ranging dogs as the only legal method to neuter them and decrease their numbers to avoid increasing dog-human conflicts on streets. Scientific literature holds that sterilization does not cause any marked changes in the behavior of dogs during the experimental period or at least two months after sterilization. The procedure has also been found to reduce sexual activity or aggression specifically.

In the Indian Institute of Science Education and Research (IISER) Kolkata Campus, we wanted to test the same in a small population of free-ranging dogs. The dogs were surgically sterilized between June 2018 to July 2018. This sterilization drive was a contractual initiative between IISER Kolkata and **WBUAFS (West Bengal University of Animal and Fishery Sciences), Haringhata, India**. This study investigates the impact of sterilization on the social behaviors and the time-activity budget of free-ranging dogs after one year of post-sterilization. i.e., in 2019 (May-March). The study aimed to focus on social behaviors, especially aggressive, affiliative, vocalization, feeding & foraging, and mating behaviors, which are considered to play an utmost important role in maintaining the social dynamics of a group. For this study, 12 sterilized free-ranging dogs were studied and compared their social behaviors with a control population of 12 Non-sterilized dogs of both sexes (males and females) within the same habitat in IISER Kolkata Campus (22.9638° N, 88.5245° E), Mohanpur, West Bengal, India. This study was conducted in 2019 in three physiological seasons pre-mating (May-July 2019), mating season (August-November 2019), and post-mating season (January-March 2020).

The case study reveals that surgical sterilization introduces very subtle changes in the behavior of free-ranging dogs except in the case of affiliative behaviors where a significant difference was observed between the two populations (sterilized and Non-sterilized). The results also reveal no marked differences in the overall time-activity budget. The dogs spent different amounts of time in different categories of behaviors, irrespective of whether they were sterilized or non-sterilized dogs. Thus, sterilization does impact the free-ranging dogs as sterilized dogs tend to be less affiliative after one year of post-sterilization.

Interestingly, contrary to expectations, there was no drop observed in mating-related behaviors of the sterilized dogs compared to the non-sterilized ones. Findings from this study are in sync with existing studies from India and other countries wherein surgical sterilization has been shown to produce no marked behavioral changes, especially in the context of sexual activity or aggression towards dogs and humans.

However, this case study was studied on very small sample size, with an unequal sex ratio and in a very controlled environment of an educational campus. Results may vary in a large-scale study with other random factors and biases included. This case study is solely ethological and does not consider the variation of other physiological parameters that may have been affected as a result of the surgical procedure.

Session II (Chair: Barbara Caspers)

14:15 **The evolution of marsupial social organization**

Jingyu Qiu, Charlotte-Anais Olivier and Carsten Schradin

Institut Puridisciplinaire Hubert Curien – Département Ecologie, Physiologie et Ethologie, Université de Strasbourg

Talk It is generally believed that marsupials are more primitive mammals than placentals and mainly solitary living, representing the ancestral form of social organization of all mammals. However, field studies have observed pair and group-living in some marsupials, but no comparative study about their social evolution was ever done. Here we describe the results of primary literature research on marsupial social organization. Our literature research indicated that most species show pair or group-living and many shows intra-specific variation in social organization. Using Bayesian phylogenetic mixed-effects models with a moderate phylogenetic signal of 0.18 we found that the ancestor of modern marsupials had 57% probability of being strictly solitary or showing some sociable form including pair- or group-living (combined probability of 43%). For Australian marsupials, group-living species were less likely to be found in climate representing tropical rainforest, and species with a variable social organization were associated with low and unpredictable precipitation representing deserts. Our results suggest that modern marsupials are more sociable than previously believed and that their ancestral state might not have been strictly solitary living, such that the assumption of a solitary ancestral state of all mammals may also need reconsideration.

14:25 **The “Model/Rival” training method with long-tailed macaques (*Macaca fascicularis*)**

Judit J. Stolla, Carina Bruchmann, Julia Fischer and Stefanie Keupp

Georg-August-University of Göttingen and German Primate Center

Talk Animals learn about their environments by individual and social learning. The presence and behavior of conspecifics affects individuals' behavior and attention in wild and captive settings. The “Model/Rival” (M/R) training method makes use of this: trainees learn the desired responses in interactive settings, where an agent models the desired response and simultaneously acts as a rival for the experimenter's attention. Here, we adapted the M/R technique to teach long-tailed macaques two behaviors for a behavioral study: (i) pulling a lever and (ii) exchanging tokens with the experimenter. As two of our subjects failed to learn pulling the lever, we hoped that M/R training would help them understand the task. Indeed, in our preliminary data, probability to pull increased from 5.5% to 49.1%. We also assessed the efficacy of the M/R method compared to individual learning in a token-exchange task. Four naïve monkeys received both training types with order of Alone and M/R condition counterbalanced between subjects. We found that subjects profited from the M/R method and were more likely to exchange tokens after having received the M/R condition (Exchange probability for subjects with order M/R-Alone: Cond1 = 20.4%, Cond2 = 45.0%, for subjects with order Alone-M/R: Cond1 = 2.7%, Cond2 = 36.7%). Taken together, we found the M/R method to be an effective tool to improve learning and performance in two tasks and encourage to study the implementation of social learning in training settings.

14:35 **Altruistic and mutualistic strategies of cooperation in captive gorillas**

Sadie Tenpas, Manon Schweinfurth and Josep Call

University of St Andrews

Talk Reciprocity, 'helping those who were helpful before', is one strategy underlying cooperation. Yet, reciprocity relies on seemingly altruistic behaviours, which can be exploited by others without reciprocating favours. Alternatively, mutualistic help, where behaviour provides benefits to an actor and their partner, is less vulnerable to exploitation. Furthermore, often actors help not only a single partner, but their help can be utilised by others similar to a public good, e.g. alarm calls, defending territories, and providing food. To better understand the strategies underlying cooperation, our experiment aims to investigate the conditions under which altruistic and mutualistic help may arise while considering the role of public goods. To do so, we observed gorillas donating juice to others using dispenser apparatuses. The gorillas could press buttons under two altruistic conditions, where juice was donated either to one partner or to the entire group, and two mutualistic conditions, where juice was delivered either to the actor and their partner or the entire group. We are currently in the process of finishing our data analyses. From our results, we hope to elucidate whether helping is more likely to occur (i) under altruistic or mutualistic conditions, (ii) when benefits extend to the entire group or specific partners, as well as (iii) under which condition reciprocity is more likely to occur. Our findings will help us understand which strategies underly cooperative helping in gorillas, as well as whether and how they avoid exploitation by cheaters.

14:45 Dominance rank during adolescence shapes the cortisol response of female guinea pigs

Taylor L. Rystrom, S. Helene Richter, Norbert Sachser and Sylvia Kaiser
University of Münster

Talk Adolescence is a sensitive phase during which phenotypes such as behavior and glucocorticoid (e.g. cortisol) concentrations can be shaped by the social environment. This hypothesis is well-supported by studies focusing on males while data on females is largely lacking. Using female guinea pigs, we investigated the relationship between dominance rank and cortisol concentrations during adolescence. Females were pair-housed upon weaning, and dominance rank was determined by the outcomes of social interactions in the home enclosure. Dominance rank was later manipulated by replacing the housing partner with either a larger or smaller female, forcing the focal female to become dominant or subdominant. Cortisol concentrations (baseline and response to a challenge) were measured at four time points throughout the experiment. Here we show that the social environment plays an important role in shaping cortisol responsiveness in females during adolescence, but that baseline cortisol concentrations are largely unaffected by dominance status. Cortisol concentrations did not initially differ between females who would later become dominant or subdominant. However, cortisol response was shaped to the acquired dominance rank, with subdominant females expressing a significantly stronger cortisol response than dominant females. Furthermore, the magnitude of cortisol response was reshaped after dominance rank manipulation such that the cortisol response of females forced to become subdominant significantly increased in the three weeks after rank manipulation. These findings demonstrate that phenotypes such as cortisol responsiveness can be shaped by the social environment and reshaped when the social environment changes during adolescence for females.

14:55 Phenotypic integration between morphology and behaviour at different hierarchical levels

Irene Gaona-Gordillo, Alexia Mouchet, Alexander Hutfluss, Niels J. Dingemans and Benedikt Holtmann
Ludwig-Maximilians-Universität München

Talk Phenotypic integration refers to the covariation of functionally related traits that contribute to the performance of an organism. Recent studies focused on understanding

how morphology, physiology, and behavior are integrated, and how a specific combination of traits is maintained among individuals, populations, and species. For example, a study in great tit males (*Parus major*), found that morphology and behavior were integrated by two distinct mechanisms: i) individuals with lower body mass (independent of from body size) were more explorative and more aggressive, and ii) individuals that explored their environment more actively and defended their territory against conspecifics were also relatively larger (i.e., more body mass, and larger tarsus, bill, and wing). We aimed to replicate this study by assaying great tit individuals from a different population and performed a cross-species validation by testing the same patterns in a related species, the blue tit (*Cyanistes caeruleus*). Using multi-variate mixed models incorporating repeated measures data, and structural equation modelling, we tested 23 different a priori formulated models for trait integration. We found that the same correlation structure was supported in the newly collected great and blue tit datasets as previously demonstrated for great tits in the previous study. This implies that the integration of behavior and morphology represents a common characteristic of multiple great and blue tit population alike.

Session III (Chair: Aurelia Strauss)

15:15 **The hybrid delay task reveals individual variability in bumblebees' self-control**

Eleonora Rovegno and David Baracchi
University of Florence

Talk Self-control (i.e., the ability to control impulsive behavior in a tempting situation) can be extremely beneficial in a variety of social and foraging contexts, as this ability allows goal-directed behaviors and optimal foraging. However, choosing to wait is not necessarily paired with the ability to sustain that choice. In this study, we developed a hybrid delay task paradigm combining delay choice and delay maintenance to investigate bumblebees' self-control. Free-flying bumblebees were first individually trained in an artificial foraging arena to associate two differently colored (yellow/blue) artificial flowers either with an immediately accessible small reward (5 μ l of sucrose solution) or a delayed-large reward (5x4 μ l of sucrose solution; 15s delay). Then, bumblebees that reached the learning criterion were offered 10 delay choices between the two flower/rewards. In this delay choice test, once the choice was made the decision could not be reversed. Eighteen individuals (75%) chose to wait and thus were confronted with the delay maintenance test. Here, we removed the 15 s limit for the delay and recorded the time spent by each individual on the delayed-large reward option before they defected for the smaller and available option. Six bumblebees (33%) waited for the larger reward, sustaining the delay for an average of 177s. Our results show that bumblebees can choose to wait for a better reward and then sustain the delay for a better reward, accordingly to the optimal foraging theory. Further studies are needed to better investigate the variables influencing bumblebees' self-control in an experimental set-up.

15:25 **Serial Reversal in Ravens (*Corvus corax*). Learning patterns and individuality**

Daria Nagel
Universität Wien

Talk Learning flexibility has been previously linked with ontogenetical and social factors enabling animals to adapt and increase their chance of survival. Understanding the cognitive requirements and ensuing abilities is, however, often obscured by associative alternatives. This study aims to get a closer look at the factors playing a role in the abilities

of learning and relearning patterns and the connected capabilities in the common raven (*Corvus corax*). Through a serial reversal task in which the subjects, upon learning a certain rewarded stimulus, needed to switch to the opposite of the two presented colours, forms of generalisation and learning abilities were measured according to the amount of needed trials and errors until reaching the learning criterion. Confounding factors such as age, experience, sex, stress, and breeding status were subsequently excluded to be of a significant influence on the learning outcome. The mean improvement over the trials and the number of errors linearly decreased over the session of the experiment. This indicates that all ravens were able to successfully master the experiment and, hypothetically, were able to generalise a pattern over time. A general pattern could be observed while individuals still presented a strong interspecific difference. Further research into the effect of personality, such as fast and slow learners, would be needed to gauge the exact factors for the found variance.

15:35 Time perception of domestic pigs: what makes pigs' time fly?

Kristina Kull, Christoph Winckler and Sara Hintze

Division of Livestock Sciences, Department of Sustainable Agricultural Systems, University of Natural Resources and Life Sciences

Talk Time perception, an area of longstanding interest in comparative cognition, encompasses the ability to detect the passage of time and to predict future events. In this study, 28 pigs were trained to discriminate between a short (1 s) and a long (8 s) tone by choosing a correct goal-box on the right or left side of a test arena. 26 pigs reached the learning criterion ($\geq 80\%$ correct choices in two consecutive sessions; mean \pm sd: 20 \pm 8 sessions). These pigs were subsequently tested in six test sessions, where in addition to learnt short and long tones, they also heard tones of intermediate durations (i.e. 2.75, 4.5 and 6.25 s). In test sessions, pigs had to decide if the unlearned intermediate tone felt rather like 'short' or 'long' by choosing the right or left goal-box. Prior to testing, pigs in the treatment group (N=17) experienced either enriched or unenriched waiting (4 min) or started the test session without prior waiting. Pigs in the control group (N=9) always started test sessions without prior waiting. As predicted, pigs in the control sessions from the treatment group and pigs from the control group performed similarly in the task ($\chi_1^2=1.105$, $P=0.293$). Interestingly, there was a tendency for fewer long choices in test sessions with prior enriched, but also unenriched waiting when compared to control sessions ($\chi_2^2=5.433$, $P=0.066$), indicating that pigs' time was going by faster following both waiting treatments. In conclusion, this study indicates that pigs' experienced time is sensitive to time distortion.

15:45 How powerful is a touch? The influence of regular touchscreen training and its termination on hormones and behaviour in mice

Sophia Quante

University of Münster

Talk Automated touchscreen (TS) testing methods are increasingly used in animal research, due to the many advantages they offer. The procedure requires an intensive training phase and researchers even suggest an enriching effect of TS training. However, only little is known about the physiological and psychological impact of TS-based procedures on animals. In the study presented, the aim was to investigate the impact of TS training, as well as its termination on hormones and behaviour in mice. Therefore, two groups of male mice from the strain C57BL/6J were tested for their anxiety-like and exploratory behaviour in a battery of standardised tests after they were TS trained, respectively TS training deprived. To check for an influence of food restriction usually applied during TS training, two control treatments were included for each subgroup: one receiving a food restriction, the other

receiving ad libitum food. In addition to the examination of anxiety-like and exploratory behaviour, home cage behaviour and faecal corticosterone metabolite (FCM) concentrations were analysed. TS training was found to affect FCMs, as well as anxiety-like and exploratory behaviour in a sustained manner, as differences to the controls were still found two weeks after the TS training was terminated. Moreover, a shaping effect of food restriction on the home cage activity profile was detected. The results will be discussed towards different interpretational approaches and regarding a potentially enriching effect of the TS training.

15:55 How do you feel? Measuring emotional states in mice using two different cognitive judgement bias paradigms

Louisa Bierbaum

Department of Behavioural Biology, University of Münster

Talk Cognitive judgement bias tests have been established as a novel method to assess emotional states in animals. They rely on ‘optimistic’ or ‘pessimistic’ interpretations of ambiguous cues and find use in research fields such as animal welfare, neuroscience and psychopharmacology. For mice, the predominantly used species in experimental research worldwide, the implementation of a validated cognitive judgement bias test would be particularly valuable. Therefore, this study aimed at validating two recently developed active choice paradigms for mice. One task relied on tunnels of different lengths as ecologically relevant cues, tapping on the well-established abilities of mice for spatial orientation. The second task made use of visual cues in an automated touchscreen system with potential for translational research. Female C57BL/6 mice were trained in either of the two paradigms. As soon as they reached the test phase, half of the mice experienced an enrichment removal as a putatively negative affect manipulation. Both cognitive judgement bias tests revealed responses to trained and ambiguous cues in a graded curve, the basic precondition to validate the tasks. However, the enrichment removal had no effect on cognitive judgement bias. While this surprising result could have been explained by an insufficient sensitivity of the two paradigms, the enrichment removal did not influence simultaneously measured stress hormone concentration and anxiety-like behaviour either. It is thus questionable if the enrichment removal was effective in influencing the emotional state of the mice. This underlines the need for a combination of different measures when validating novel cognitive judgement bias tasks.

16:05 On the tracks of animal personality – Is it linked to animal welfare?

Marlene Sroka, Vanessa von Kortzfleisch, Viktoria Siewert, Sylvia Kaiser and Helene Richter
Department of Behavioural Biology, University of Münster

Slam The concept of animal personality is a hot topic in the field of behavioural ecology. However, in animal welfare science, it is underrepresented, even though welfare impairments may be personality-dependent. It was hypothesised that having a certain personality type may already hold a predisposition to develop abnormal behaviours, such as stereotypies. Different personality types possibly also vary in their requirements of the environment that are necessary to fulfil the individual needs. Highly standardised and mostly restrictive housing conditions are therefore unlikely to equally meet the needs of different personality types. Here, we want to present the conceptual design of a running study that investigates intersections of animal personality and animal welfare in the most commonly used animal model, the mouse. Personality assessment covers several behavioural traits and different contexts (home cage & standard test setting). Resulting data will create a comprehensive picture of i) specific trait expression compositions of various traits on the individual level and ii) behavioural syndromes on the population level. We observe mice living in either standard or super-enriched housing conditions. Unlike in

most studies, here, personality and welfare assessment are not limited to a short time frame, but comprise the entire life-span. This not only allows us to investigate how personality in different behavioural traits develops over life or whether personality differences may come along with differences in individual welfare and life-expectancy. This experiments' longitudinal character also confronts us with conceptual obstacles of "animal personality".

Session IV (Chair: Sylvia Kaiser)

16:25 **Bumblebees can differentiate sucrose solution from water at a distance**

Melina Kienitz, Massimo De Agro' and Tomer J. Czaczkes

University of Regensburg

Talk Bees are major model organisms for studying pollination processes, ecology, and cognition. Training and testing paradigms often use drops of sucrose placed on artificial flowers as a reward. However, the fact that sucrose is spectrally different from water is ignored. Given their ability to perceive a different spectrum than humans do, we asked whether bees could differentiate between sucrose solutions and water visually, without the need to even consider other concurrently presented cues. To test this, we presented bumblebees (*Bombus terrestris*) a drop of 1.6M sucrose solution next to a drop of water. The initial choice on each visit was recorded, and whether the bee hovered in front of the drops, and thus had an opportunity to inspect both. 71% of bees who inspected both drops chose the sucrose. Due to increased viscosity, drops of sucrose could be recognized by their shape, not only their colour. We thus also carried out a second experiment by placing the drops inside centrifuge tubes filled with cotton. This removed the structural differences of the drops, and reduced colour information. 66% of choices were for the sucrose-containing centrifuge tube. A third experiment with cigarette filter tips was conducted to enhance potential colour cues while eliminating structural information, to see if they are differentiating by colour or structural cues. They still chose 70% sucrose when both options were inspected. While non-visual cues, such as local humidity differences, cannot be ruled out, it is clear that bees can distinguish sucrose solution and water at a distance.

16:35 **Daily activity patterns across the annual cycle of the European Bee-eater (*Merops apiaster*) in the breeding and non-breeding period - do sex and age matter?**

Carolina Trcka-Rojas

Paris Lodron Universität Salzburg

Talk The daily behaviour of birds is highly dependent on their energy budgets, which can significantly differ between days, within the annual cycle and dependent on age and sex. Both biotic and abiotic ecological factors within habitats, like ambient temperature, wind speed and insect abundance, are crucial to the activity patterns of birds. Seasonal changes in activity are especially apparent in long-distance migratory species, as they show clearly separated behavioural periods within their annual cycle. In the European bee-eater, *Merops apiaster*, these distinct seasons are the breeding period in the Palearctic, the non-breeding period in the Afrotropic and the two migration periods within the biogeographic realms. Because of these drastic changes in habitat, the activity patterns are expected to significantly differ between the periods. Using multi-sensor loggers, which are fixed onto the birds to measure light intensity, air pressure and acceleration, the individual daily activity is statistically analysed. The resulting activity patterns are compared within and between the breeding and non-breeding period, as well as between age groups and sexes. Comparisons of the individual activity to the local weather, among other factors, are

expected to show some degree of correlation. The aim of the study is to deepen the understanding of the activity patterns in *M. apiaster* across the whole annual cycle, detect and accurately quantify changes in behaviour and compare the influences of sex and age.

16:45 **Vocal plasticity during infancy: ontogeny of the trill call in grey mouse lemurs**

Alexandra Langehennig-Peristenidou, Daniel Romero-Mujalli, Tjard Bergmann and Marina Scheumann

Institute of Zoology, University of Veterinary Medicine Hannover

Talk During language acquisition, human infants undergo a developmental phase of high auditory-feedback-dependent vocal plasticity also reported for marmosets and gibbons. Vocal streams with high vocal plasticity during infancy occur also in grey mouse lemurs. Therefore, this study aims to investigate how these variable calling bouts contribute to the development of the complex advertisement call not present at birth, the trill call, in grey mouse lemurs.

We used 290 infant calling series (N = 15 families) recorded during four age classes representing different infant developmental stages and 50 adult trill calls (N = 39 individuals) as reference. Temporal and spectral acoustic parameters were measured for each syllable of a bout. To define syllable types, dimensionality reduction techniques combined with unsupervised cluster analysis were performed. Based on the obtained results, transition networks were established to visualise the sequential order of the syllable types for each age class.

Several syllable types were obtained, which differed in their occurrence across age classes. Syllables with almost no frequency modulation occurred mainly around birth, whereas frequency-modulated syllables occurred in the later age classes. With increasing age, the sequential order of the syllable types bore more resemblance to the adult trill call.

This suggests that adult trill calls develop during infancy by increasing the frequency modulation of syllables and by combining specific syllable types into a complex sequence. Further studies will address whether this is based on maturation or whether auditory templates of the parents are imitated.

16:55 **Eavesdropping on Speech in Crows**

Sabrina Schalz

Middlesex University

Talk Eavesdropping on heterospecific vocalizations is a highly useful skill as it may alert individuals to the presence of a predator. Perception of heterospecific vocalizations even extends to human speech: Cotton-top tamarin monkeys, rats, and Java sparrows can learn to discriminate two spoken languages. Speech perception may also be a useful skill outside a laboratory environment, in particular for urban wildlife with high rates of human disturbance in their habitats. Urban animals might eavesdrop on human speech like they would on non-human predator vocalizations.

I previously tested whether Large-Billed Crows wild-caught in Tokyo respond differently to Japanese (the local language) than to Dutch (a foreign language), without receiving any training or rewards for this behaviour. The crows showed significantly more responses to the Dutch than to the Japanese playback, suggesting they had listened to speech out of their own motivation before and were already familiar with Japanese.

To investigate this behaviour further, I am currently replicating the playback experiment with wild Carrion Crows in London and Milton Keynes. These two cities differ in their human population density and extent of urbanization, as well as human behaviours towards crows. Preliminary data from the London site suggests a differential response to speech compared to non-human control vocalizations, but not between different languages. Data from these sites will help to understand the effect of urbanization,

exposure to humans, and human behaviour on speech eavesdropping, as well as potential benefits driving this behaviour.

17:05 **The importance of size in predator recognition by untrained birds**

Ondřej Fišer, Petr Veselý, Michaela Syrová, Michal Němec, Kateřina Kopecká, Eliška Perlová and Roman Fuchs

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Talk An integral characteristic of all predators is their size, which affects, among other things, their food preferences, and the ability of their prey to defend themselves. Several studies have already found, unsurprisingly, that birds discriminate between predators of different sizes and respond to them. In our experiments, we exposed red-backed shrikes to size-modified dummies of the same predator species (shrunken carrion crows and enlarged Eurasian jays). The red-backed shrike usually aggressively attacks the unmodified jay, whereas it remains passive towards the unmodified crow. In our experiments, the shrike responded to the enlarged jay with less aggression, indicating that it assessed aggression towards the jay as ineffective. Aggression increased only slightly to the shrunken crow. Thus, the reason why the shrike does not attack the unmodified crow is probably not its size, but it is an alternative antipredation strategy, the analogy of which has already been demonstrated in relation to the Eurasian magpie. However, experiments with jays demonstrate for the first time that the shrike perceives predator size as a separate parameter and responds exclusively to it by changing its behaviour.

17:15 **The diet ecology and breeding habitat choice of barn owls (*Tyto alba*), in Brandenburg, Germany**

Magdalena Włodarz

University of Potsdam

Slam The balance act of parents whether to breed and care for their young or to reproduce at another time, differs widely in the animal kingdom. The analysis of individual decisions based on the choice of prey and habitat during breeding time was the basis for our long-term study of the barn owl (*Tyto alba*) in Brandenburg, Germany. It questioned the parents' preferences (i) over prey species given to their young and (ii) in habitat choice when nesting. We expected that breeding couples undergo a cost-benefit decision-making to secure future resources. We compared prey species by identifying regurgitated parts of adult and young owl's meals, commonly known as pellets. The dissected pellets (n=1637) had been used to detect a strategy in feeding the young, such as a prey species-based preference. We found higher proportions of voles in young barn owl pellets in comparison to adult barn owl pellets. Barn owls preferably delivered prey from the family of *Cricetidae* to their offspring. Additionally, we mapped nest and roost sites of *Tyto alba* (n=58) to detect shared habitat mosaics. We hypothesized high proportions of neighbouring open landscapes, such as grasslands, in used nest boxes to reduce energy and time loss while hunting. We found increasing probability of breeding and increasing numbers of young owls with rising proportions of grassland in 500 metres around nesting sites. The results indicate that barn owls choose prey and habitat while breeding. We conclude that choices took place to reduce transport and foraging costs in breeding time.