

## **Wednesday, April 5th**

9:00-17:00 Pre-conference Satellite meeting on « Cultural Evolution by Cultural Attraction: Empirical Issues »  
(more information [here](#))

**17:00 Registration for main conference opens**

**18:00 – 19 :00 Plenary Lecture 1 (Jean Jaurès)**

Dan Sperber, *An evolutionary approach to human reason*

Reason as classically understood – a super-power that radically separates humans from other animals – makes little evolutionary sense. Evolutionary approaches to reasoning have cast doubts on the very existence of such a domain general cognitive capacity and focused on more plausible domain-specific mechanisms of inference. Hugo Mercier and I, however, have suggested that one of these specialized mechanisms might have as its specific domain a very special type of meta-representations, namely reasons. The talk will describe such a hypothetical modular mechanism, argue that it has two functions: justification and argumentation, both involved in social interaction (rather than in individual cognition), and show how such a narrowly domain-specificity module might provide a form of virtual domain-generality.

**19:00 Welcome reception**

## Thursday, April 6th

### 09:00 – 10:00 Plenary Lecture 2 (Jean Jaurès)

Melissa Bateson, *Obese humans and fat birds: a possible role for developmental food insecurity?*

Food insecurity is associated with higher body fat in both humans and other animals. The insurance hypothesis (IH) explains this relationship by suggesting that the evolutionary function of stored fat is to provide a buffer against shortfalls in the food supply: when the next meal is unpredictable, a larger buffer is required to avoid potential starvation. The IH predicts that individuals should store more fat when they receive cues from the environment that access to food is unpredictable. This prediction has been successfully tested in adult birds by experimentally manipulating food insecurity and measuring the consequences for fat storage. The results demonstrate that there is indeed a causal relationship between food insecurity and fat in adult animals as predicted by the IH. However, we currently know very little about the nature of the cues animals use to assess food insecurity and the timescales over which these cues affect behaviour. I will describe the results from five years of work on European starlings in which we have started to address the role of early-life experience in determining adult foraging behaviour and fat storage. In a series of experiments, we have manipulated various aspects of feeding experience in nestling starlings and studied the impact of these manipulations on individuals followed longitudinally for up to three years. Our results show long-term effects of early-life experience on both foraging behaviour and body fat. Furthermore, we have evidence that restricting food in early life has subtly different effects from varying the amount of begging effort required to obtain food. Our results therefore suggest that developmental food insufficiency and food insecurity have different effects on adult behaviour and fat storage decisions. On the basis of our results, we hypothesise that early-life experience may be important in calibrating the mechanisms that estimate the dangers of starvation from food shortfall in adulthood. I end by discussing the implications of these findings for understanding the factors contributing to the human obesity pandemic.

### 10:00 – 10:50 Session 1: Life History Theory (Jean Jaurès)

Gonzalez-Forero, M., Faulwasser, T., Lehmann, L. *A model for brain life history evolution*

Many primarily verbal hypotheses exist to explain large-brain evolution, but their mathematical formalization could help deepen our understanding of the processes involved. Here we combine elements of life history and metabolic theories to formulate a metabolically explicit mathematical model for brain life history evolution that can yield quantitative predictions for brain and body mass, and skill, throughout ontogeny from a chosen large-brain evolution hypothesis. We assume that some of the brain's energetic expense is due to production (learning) and maintenance (memory) of energy-extraction skills (or cognitive abilities), and that individuals can allocate extracted energy to the growth of their different tissues. The model can be used to ask what fraction of growth energy should be allocated at each age, given natural selection, to growing each tissue under a chosen biological setting capturing the hypothesis of interest. We apply the model to find uninvadable allocation strategies under a baseline setting ("me vs nature"), namely when energy-extraction challenges are environmentally determined and are overcome individually but possibly with maternal help, and parameterize the model with modern-human data. We find that: (1) a me-vs-nature setting is enough to generate adult brain and body mass of ancient-human scale and a sequence of childhood, adolescence, and adulthood stages; (2) large brains are favored by intermediately challenging environments, moderately effective skills, and metabolically expensive memory; and (3) adult skill is proportional to brain mass when metabolic costs of memory saturate the brain metabolic rate allocated to skills.

Frankenhuis, W. *Cognitive Adaptations to Harsh Environments*

Growing up in a harsh environment has a major impact on cognition. People from such environments tend to score lower on a variety of cognitive tests. The predominant view in psychology is, therefore, that chronic exposure to harsh conditions impairs cognition. I have recently challenged this consensus by proposing that harsh environments do not exclusively impair cognition; rather, people also developmentally adapt (or 'specialize') their minds for solving problems relevant in such conditions. These problems might require different skills and abilities from those assessed on conventional tests. This hypothesis predicts harsh-adapted people may show enhanced performance on tasks that match recurrent problems in their environments, compared with safe-adapted people. In this talk, I will present results of a preregistered study examining whether exposure to, and involvement in, violence enhances people's (N=126) learning and memory for danger, but not for location, information. The better we understand harsh-adapted minds—including their strengths—the more effective we can tailor education, policy, and interventions to fit their needs and potentials.

### 10:50 – 11:20 Coffee & tea

### 11:20 – 12:20 Speed session 2: Reproduction (Jean Jaurès)

Howard, J., Gibson, M. *Testing evolutionary explanations for female genital cutting: does it control female sexual behaviour or enhance paternity certainty?*

Testing evolutionary explanations for female genital cutting: does FGC control female sexual behaviour or enhance paternity certainty? The evolutionary origin and persistence of female genital cutting (FGC) has often been linked to a desire to control female sexual behaviour. It is argued that FGC reduces women's sexual activity before or within marriage, which provides their potential husbands with increased paternity certainty. Therefore cut women are more desirable marriage partners, and FGC is perpetuated by families hoping to enhance their daughters' marriageability. We test these predictions using large demographic datasets from 5 countries in West Africa (n=52,889) where the practice occurs but varies in prevalence. Our results show that having FGC is not a significant predictor of reduced sexual activity before marriage for the majority of women (in 4 out of 5 countries). Further in terms of male attitudes to FGC, a higher proportion of men who directly support its continuance consider the benefits to be "social acceptance for women" rather than "prevention of premarital sex". We also find that proxies for concern about paternity certainty (such as frequent male absences or polygyny) do not predict the FGC status of a man's first wife. And finally, we identify that women without FGC are significantly more likely to be married later than average for their ethnic group (in 4 out of 5 countries). In combination these results show that FGC does not reduce female sexual activity, but it may influence marriage opportunities indicating that cultural evolutionary forces may be underpinning its persistence.

Hopcroft, R. *Is fertility after the demographic transition maladaptive?*

**Objective:** It is often claimed that fertility in modern societies after the demographic transition is maladaptive. This paper examines this issue.

**Methods:** Fertility levels and variances for both males and females separately are examined in a wide range of societies across the three stages of the demographic transition – pre-demographic transition, while the transition is in progress, and post-demographic transition. The paper notes that fitness is always relative to the fitness of others in a population. Even in very low fertility societies, individual fitness as measured by the share of genes in subsequent generations may still be maximized.

**Results:** Across societies, when male fertility is measured separately, high status men (as measured by their wealth and personal income) have higher fertility than low status men even in very low fertility societies, so individual males appear to be maximizing their fitness within the constraints posed by a modern society. Thus male fertility cannot be considered maladaptive. When female fertility is measured separately, in both very high and very low fertility societies there is not much variance across women of different statuses in completed fertility. Only in societies currently changing rapidly (with falling fertility rates) do we see a somewhat high variance across women of different statuses in completed fertility.

**Conclusion:** I suggest that what we see across all phases of the demographic transition is a continuation of two different evolved human reproductive strategies – one male, one female - in changing social and material contexts.

Bovet, J., Raiber, E., Ren, W., Wang, C., Seabright, P. *Parent-offspring conflict over mate choice : An experimental investigation in China*

Both parents and offspring have evolved mating preferences that enable them to select mates and in-laws to maximize their inclusive fitness. Although such preferences may substantially overlap, evolutionary theory of parent-offspring conflict predicts that in-law and mating preferences can differ with respect to material resources and physical attractiveness of a potential mate. Indeed, individuals are expected to value physical attractiveness more in their mates than in their in-laws, and to value material resources more in their in-laws than in their mates. We tested this hypothesis in China, where parents have an active role in the search of a marital partner for their sons and daughters. In particular, parents from several Chinese cities organize "marriage markets" where they advertise the characteristics of their adult children and look for a potential son or daughter-in-law. To experimentally test the hypothesized parent-offspring conflict in mating preferences, we presented 800 parents and young adults from the city of Kunming (Yunnan) with hypothetical mating candidates varying in their levels of income and physical attractiveness. Consistent with evolutionary theory, we found significant differences between offspring and parents' preferences, when children regarded physical attractiveness as more important than parents. We also found a strong effect of the sex of the mating candidate on preferences, as physical attractiveness was deemed more valuable in a female potential mate or in-law, thus underlining the specific role of female physical appearance in the evolution of mate choice.

Myers, S., Page, A., Dyble, M., Migliano, A. *Why so many Agta boys? Extreme sex ratios in Philippine Foragers: A test of evolutionary hypotheses*

The sex ratio at birth in industrialised populations is approximately 105; this 'normal' slight skew has been explained, using Fisherian evolutionary logic, as a product of higher male mortality rates. The more extreme male biased sex ratios observed in multiple foraging societies are generally argued to result from female infanticide. Yet, this is at odds with the sexual egalitarian nature of many immediate-return foragers and the lack of ethnographic evidence of systematic female neglect/infanticide. The biasing of parental investment dependent on maternal condition and/or environment has been documented in sex ratios at birth across multiple human populations. Poor circumstances often predict excess female births, in line with the Trivers-Willard hypothesis; however, during the Cuban economic depression in the 1990's, WWII's Dutch Famine, and both World Wars in Germany more males were born in association with the risk of excess male mortality. Using data on age-specific sex ratios, mortality, and parent-offspring proximity from the Palanan Agta (population sex ratio = 117) we explore two explanatory models for sex ratios in foraging ecologies: that they result (1) from female neglect, leading to a pattern of age-specific sex ratios which is near balanced at birth and skews towards males as cohorts age; or (2) from a skewed sex ratio at birth, whereby the sex ratio is male biased and subsequently declines as higher rates of male mortality take effect. Finally, we investigate the adaptive value of male biased sex ratios in foraging ecologies, exploring household productivity and fitness consequences associated with male presence.

Willführ, K., Johow, J., Voland, E. *Differential mortality of reproductive females by family-network composition: Family matters, indeed*

Motivated by the cooperative breeding hypothesis we investigate the effect of having kin on the mortality of reproductive women based on family reconstitutions of the Krummhörn region (East-Frisia, Germany, 1720-1874). We rely on a combination of Cox regression models clustered at the family level and stratified at the family level to model the life history of 4,661 women from the date of their first marriage until the age of 45. In order to study behavioral-related effects we run a series of models in which only kin who live in the same parish are considered. To investigate structural, non-behavioral-related effects we run a different model series which included all kin alive regardless their spatial proximity. As expected we find that mothers reduced mortality of their reproductive daughters. Sisters appear to have an ambivalent impact. Dependent on the social economic status the effect of sisters staggers between rather competitive and rather supportive tendencies. Mothers-in-law play a significant role. Especially among the elite mothers-in-law are associated with reduced mortality. We interpret this finding as a consequence of augmented intermarriage among higher social strata. For instance, in first cousin marriages mothers-in-law are also biological aunts. Among the elite the genetic in-law-conflict might be therefore to some extend neutralized by family solidarity. This further suggests that the switch point of the female trade-off between staying with the natal family and leaving the natal in favor of an economical well-established in-law family might be reached very quickly under the socio-economic conditions of the Krummhörn region.

Hedges, S., Sear, R., Todd, J., Urassa, M., Lawson, D. *Are children more valuable at school or at home? Testing the assumptions underlying economic and evolutionary models of the demographic transition in rural Tanzania*

High levels of parental investment, extended juvenile dependency and children's contributions to the household economy are unusual features of human life history, enabling high fertility and facilitating complex skill acquisition. Evolutionary anthropologists have argued that economic modernisation leads to a transition to low fertility because parents perceive increased benefits to formal education, and reduced benefits to children's work. However, few studies have empirically examined children's time allocation in modernising economies, to test the assumptions underlying this model. In rural African settings, children's time allocation presents a dilemma for parents. While skills gained through formal education are increasingly important, children's work remains valuable to households. Using data collected from 1,278 children, we consider the impacts of household livelihood on children's time allocation in a rural area of Mwanza, north-western Tanzania. We predict that parents in more market-integrated livelihoods will value education more and child work less than parents engaged in subsistence livelihoods (agropastoralism). Contrary to predictions, market-integrated livelihoods were not associated with more time spent in education. For girls, market-integrated livelihoods were associated with less time in education, and more time in household chores, suggesting they may be compensating for the loss of adult women's household work. For boys, agropastoralism was associated with increased work time, but the expected trade-off between work and education was not seen: instead these boys had less leisure time compared with boys in other livelihoods. These findings question some of the common assumptions underlying economic and evolutionary models of the demographic transition.

**12:20 - 13:20 Lunch**

## 13:20 – 14:20 Parallel sessions 3A, 3B, 3C

### Session 3A: Mating 1 (Théodule Ribot)

Pawlowski, B., Nowak, J., Borkowska, B. Augustyniak, D. Drulis-Kawa Z. *Man's body height and immune system quality*

**Objective:** According to the energy allocation and good genes hypotheses, body height may reflect biological quality. Studies show that taller men are perceived as more attractive and have higher mating and reproductive success. It is then likely that man's height might signal such fitness-related trait as the immunity. Here we test the relationship between body height in healthy men and their key immune functions.

**Methods:** Body height was measured in 96 men (aged 19-37) included in the study. Immune system was assessed by components of both innate (complement activity, lysozyme activity, neutrophils functions) and adaptive (number of lymphocytes subpopulation, immunoglobulin serum levels and the strength of post-vaccination response to flu) immunity.

**Results:** When controlling for immunomodulatory factors such as age, adiposity and testosterone level, there was no significant relationship between man's body height and the analysed immune parameters.

**Conclusions:** Our results indicate that women's preference for relatively taller men is not related to previously proposed relationship between a man's body stature and immunological quality. To reconcile our results with the concept of signalling potential physiological quality by body height, we propose the Immunity Priority Hypothesis (IPH). According to IPH, an organism can invest in the body growth only when securing the energy for adequate immunity, and therefore the immunological quality does not need to be reflected by the body height.

The study founded by National Science Centre, Poland (2012/07/B/NZ8/02666)

Havlíček, J., Winternitz, J., Abbate, J., Huchard, E. Garamszegi, L. *Patterns of MHC-dependent mate selection in humans and non-human primates: a meta-analysis*

Genes of the major histocompatibility complex (MHC) in vertebrates are integral for effective adaptive immune response and are associated with sexual selection. Evidence from a range of vertebrates supports MHC-based preference for diverse and dissimilar mating partners, but evidence from human mate choice studies has been disparate and controversial. To better understand what processes may affect MHC-mediated mate choice across humans and non-human primates we performed phylogenetically controlled meta-analyses using 58 effect sizes from 30 studies across 7 primate species. Primates showed a general trend favoring more MHC-diverse mates, which was statistically significant for humans. In contrast, there was no tendency for MHC-dissimilar mate choice, and for humans, we observed effect sizes indicating selection of both MHC-dissimilar and MHC-similar mates. Focusing on MHC-similar effect sizes only, we found evidence that preference for MHC-similarity was an artifact of population ethnic heterogeneity in observational studies but not among experimental studies with more control over socio-cultural biases. This suggests that human assortative mating biases may be responsible for some patterns of MHC-based mate choice. Additionally, the overall effect sizes of primate MHC-based mating preferences are relatively weak (Fisher's Z correlation coefficient for dissimilarity  $Z_r = 0.044$ , diversity  $Z_r = 0.153$ ), arguing for more careful sampling design in future studies. Overall, our results demonstrate that preference for more MHC diverse mates is significant for humans and likely conserved across primates, and that a consensus on patterns of selection for MHC-dissimilarity in humans awaits studies that carefully control for confounding social and physiological factors.

Hill, A., Cárdenas, R., Wheatley, J., Welling, L., Burriss, R., Claes, P., Apicella, C., McDaniel, M., Little, A., Shriver, M. Puts, D. *Communicating developmental stability: People with symmetrical faces have more attractive voices.*

Vocal communication is a salient feature of human social behavior that has increasingly been brought within the purview of sexual selection. Vocal cues may provide information to potential mates on vocalizers' developmental stability, which can be measured from fluctuating asymmetry (FA), anatomical deviations from perfect bilateral symmetry thought to inversely index the fit between genotype and environment. In humans, FA is negatively related to facial and olfactory attractiveness. Although two studies have found negative relationships between FA and vocal attractiveness, conclusions of species-typicality are premature in light of variable methodologies applied to small, homogeneous samples. In the present research, we conducted three studies comprising an appreciably larger sample than has been used previously (231 men and 240 women). We sampled US undergraduates as well as Tanzanian foragers less buffered from developmental stressors by evolutionarily novel medical technologies, and computed FA from both two-dimensional and, for a subset of males, three-dimensional facial imagery. Voice recordings were assessed for attractiveness. Meta-analytic results across the present samples plus those used in both prior publications, yielded weighted mean correlations between FA and vocal attractiveness of -.23 and -.29 for males and females, respectively (both  $p < .001$ ). Moreover, these results were robust and statistically significant whether we included effect sizes from previously published work, or only those from the present research, and regardless of the inclusion of any individual sample or method of assessing FA (e.g., facial or limb FA), thus providing strong support that the voice conveys information on developmental stability in humans.

### Session 3B: Parenting (Jean Jaurès)

Page, A., Viguier, S., Dyble, M., Smith, D., Chaudhary, N., Thompson, J., Salali, G., Mace, R., Migliano, A. *Why care for someone else's child? Testing adaptive hypotheses in Agta foragers*

Humans are defined as prolific cooperative breeders, which arguably allows for the rapid production of highly dependent and costly offspring. Previous literature has focused on key relatives such as grandmothers, as well as exploring the adaptive value of this childcare in terms of increased child survival and/or maternal fertility. However, a systematic exploration into why these alloparents (non-parental carers) provide childcare is much rarer. Inclusive fitness models of cooperation attempt to explain behaviour from the perspective of individualistic gains and studies frequently demonstrate that more related individuals provide more childcare. However, previous research rarely separates the effects of relatedness from reciprocity, costs and benefits or explores childcare from non-kin. Consequently, the answer to 'why care' still escapes the human literature. Here, we use high-resolution proximity data from 2,045 child-alloparent dyads among Agta hunter-gatherers (Philippines), to test whether the evolutionary explanations of relatedness and reciprocity explain interactions both from kin and non-kin. Relatedness was positively associated with hourly interactions with a child, while costs associated with childcare obligations in the alloparents household negatively predicted interactions. Reciprocity was only an important predictor in distant kin and non-kin, as close kin would invest irrespectively. Thus, despite shared genes, distant kin interactions were also contingent on reciprocity. Finally, non-kin interacted more at high costs compared to distant kin, perhaps due to juvenile playgroups providing childcare *en masse*. These findings demonstrate how alternative hypothesis testing reveals the complexity of cooperative breeding, suggesting how mothers manage to produce multiple dependent offspring in unpredictable environments.

Berg, V., Lawson, D., Rotkirch, A. *Is early parenthood costly or advantageous? Availability of alloparents and reproductive timing in contemporary Finland*

**Objective:** Individuals coming from lower socioeconomic backgrounds typically enter parenthood earlier. In Western societies, early parenthood is often considered to have negative repercussions, including reduced opportunity for skill acquisition and income generation. However, early parenthood may represent an adaptive strategy to low healthy life expectancy if it, for example, maximizes the availability of familial alloparents. Empirical evidence for this hypothesis is scant. We test this hypothesis using highly reliable family network data.

**Methods:** Using FINNFAMILY, a register-based, representative, multigenerational dataset from contemporary Finland ( $N = 18,541\text{--}35,118$  depending on analysis), differences by socioeconomic background in numbers of alloparents (parents and siblings) alive and dead, the pace of alloparents dying, and their effects on reproductive timing were examined by linear and Cox regression.

**Results:** Individuals from lower socioeconomic groups tended to come from larger families and therefore had more potential alloparents. However, this initial pool of alloparents deceased at a higher rate compared to individuals with an upper-middle-class background. Controlling for socioeconomic background, a higher number of alloparents and a faster rate of them dying were both associated with a younger age at first birth.

**Conclusions:** Humans are cooperative breeders and the presence of kin remains important for childbearing behaviour in contemporary high-income societies. Our results confirm that, in terms of available familial alloparents, postponing childbearing is more costly to individuals from lower socioeconomic backgrounds. Coming from a lower socioeconomic background also speeds up childbearing, optimising potential alloparental care.

Rickard, I., Courtiol, A., *Relationships between twinning and fertility: a case of ecological fallacy within individuals?*

The ecological fallacy can be committed if inferences about the nature of within-individual processes are drawn from between-individual data. This may lead the researcher to make erroneous conclusions about between-individual differences and therefore the nature of selection and adaptation. This can be exemplified in the study of human life history by dizygotic twinning. Multiple studies have reported that women who produce twins at least once in their lifetime have higher lifetime fertility than non-twinning women, leading to the hypothesis that twinning constitutes a marker of phenotypic 'quality'. However, it does not necessarily follow from the aforementioned association that the propensity to twin is itself a trait associated with higher fitness, since selection may act on a fixed twinning propensity that individuals have, whereas the actual twinning is a binary outcome that becomes more likely if individuals experience more reproductive events during their lifetime. In this study we test the hypothesis that twinning can be considered a marker of quality. Utilizing datasets from Europe and Africa, we investigate whether and in what contexts twinning propensity may be under positive or negative selection, and with which underlying reproductive traits it is associated. Our approach and results have implications that are both specific and general. Specifically, understanding the variation in dizygotic twinning, and its associated trait architecture is of importance to understanding human life history evolution and the enigma of human litter size. Of more general importance, we highlight how crucial it is to address research questions at the appropriate level of analysis.

**Session 3C: Medicine  
(Paul Langevin)**

Alvergne, A., Vlajic Wheeler, M., Hogqvist Tabor, V. *Can premenstrual symptoms be used as a cue to an undiagnosed infection? Insights from digital health*

**Objective:** The ultimate reasons why some women experience debilitating premenstrual symptoms and others do not are unknown. Here we test the evolutionary ecological hypothesis that severe premenstrual symptoms may be symptomatic of the presence of persistent sexually transmitted infections (STIs).

**Methods:** 30,000 women were recruited through a digital period-tracker app. Women were asked: (i) Have you ever been diagnosed with a STI? (ii) If yes, when was it, and where you given a treatment? Those data were combined with longitudinal data on menstrual bleeding patterns, cramps, emotions, sexual behaviour and hormonal contraceptives use. Multi-level statistical analyses were performed.

**Results:** A final sample size of 946 women were eligible for analysis. We found that (i) women experiencing prolonged cramps before their menses are ca. 3 times more likely to be diagnosed with a sexually transmitted infection and (ii) among women diagnosed positive for an infection, treatment can be associated with a reduction of some premenstrual symptoms.

**Conclusions:** The results support the idea that PMS is an inflammatory disease and that cramps can be used as a cue to an undiagnosed infection, a leading cause of infertility worldwide. The study also demonstrates the potential of an evolutionary medicine approach for understanding not just how, but why people are sick. The opportunities and limitations of data from digital health will be discussed.

Zelañiewicz, A., Nowak, J., Figura, R., Groycka, A., Pawłowski B. *Disgust sensitivity and pharyngeal carriage of Staphylococcus aureus*.

**Objective:** Disgust is a self-protective emotion, as it triggers behavioural avoidance of pathogens and fitness-reducing activities. Individuals of lower biological condition and/or in times of lower immunity are characterised by a greater disgust sensitivity. As pathogens carriage may be a result of weakened defence mechanisms and imposes physiological cost, it may also increase an individual's disgust sensitivity. We tested if throatcolonization of *Staphylococcus aureus* (a common pathogen) influences an individual's disgust sensitivity.

**Methods:** Throat swabs were taken from 95 healthy women (age  $M=26.4\pm2.73$ ) and 130 men (age  $M=27.99\pm2.99$ ) who answered Three Domain Disgust questionnaire. *S.aureus* was identified by standard microbiological methods. Disgust sensitivity was compared between carriers and non-carriers, controlling for potential confounders (testosterone, current infections, BMI, antibiotics use).

**Results:** Although women, compared to men, displayed higher disgust sensitivity ( $p<.05$ ) regardless the domain, the difference between carriers and non-carriers was significant only in men and only in two domains. When controlling for potential confounders, colonized men exhibited higher pathogen ( $p=.02$ ) and sexual disgust ( $p=.001$ ).

**Conclusions:** Higher disgust levels only in male *S. aureus* carriers, compared to non-carriers, can be explained by lower immune resistance of men. Previous research showed that *S.aureus* carriage rates are higher in men and there is a greater risk of autoinfection for male carriers, compared to female. Thus, from an adaptive perspective, a rise in disgust sensitivity in *S.aureus* carriers should be especially beneficial for men.

**The Behavioral Immune System and Partisan Preferences: Individual Differences in Disgust Sensitivity Shape Support for Socially Conservative Parties.** Aarøe Lene, Petersen Michael Bang, Arceneaux Kevin

Political parties are deeply embedded in democratic politics. Even though most scholars agree that political parties are a crucial aspect of mass politics, there is much disagreement over the nature and origin of party preferences. Recent studies show that human immune system possesses a species-typical behavioral component that motivates people to avoid potential disease threats and that disgust is a driving motivational force in this system. Over human evolutionary history, a central source of pathogens has been other individuals. Because of the potentially fatal cost of getting an infection and the difficulty of identifying pathogens, a key feature of the behavioral immune system is to treat any unfamiliar individual or group as a potential infection risk. Past research links disgust sensitivity to ethnocentrism, negativity towards homosexuals and other socially stigmatized groups, and, ideological conservatism. On this basis, the behavioral immune system should be expected to shape party preferences: If disgust evolved to motivate avoidance of potential pathogen threats, including those from outgroups, 1) individuals high in disgust sensitivity should display an instrumental preference for social conservative parties because they promote policies related to outgroup skepticism and social distance taking, 2) socially conservative ideological preferences should establish a path linking disgust sensitivity to partisan preferences, and 3) voters should be more willing to support proposals from political parties when partisan frames activate pathogen-avoidance motivations. We test this *instrumental behavioral immune system thesis of partisanship* in a cross-national research design including nationally representative surveys collected in the United States and Denmark.

Theofanopoulou, C., Messner, A., O'rourke, T., Gastaldon, S., Martins, P., Alamri, S., Samuels, B., Boeckx, C.  
*Paleogenomic evidence for self-domestication in Homo sapiens*

**Objective:** Several scholars have entertained the idea that anatomically modern humans (AMHs) were self-domesticated, since our tolerant and cooperative behavior and our anatomical features resemble those observed in domesticated species. The aim of this study is to provide evidence from paleogenomics in favor of this position.

**Methods:** To identify signatures of a self-domestication process in AMHs, we examined the functions, interactions, pathways, and expression patterns of genes positively selected in AMHs (including genes with fixed changes in protein-coding and regulatory regions), and determined whether this gene set overlaps with genes positively selected in domesticated species (dogs, cats, horses, cattle, rabbits, lab-reared fruit-flies, and bonobos).

**Results:** Over 70 genes were found in the overlap between domesticates and AMHs, including many implicated in growth deficiencies, dwarfism and craniofacial abnormalities, neurodevelopmental disorders, axon-guidance pathways, and, predominantly, neural crest and neural-tube development. Conversely, Denisovan-and-Neanderthal variants cause craniofacial, skeletal and organ abnormalities in AMHs, accompanied by cognitive deficits that we might expect of an "underdomesticated" archaic Homo.

**Conclusions:** The extent of the overlap found in our study provides a novel source of evidence for the self-domestication hypothesis in AMHs. Domestication-related genes are involved in pathways that implicate changes in the neural crest during this process (consistent with the neural crest-based hypothesis for domestication in Wilkins et al., 2014), but also brain and behavioral changes. Strikingly, domestication-genes in AMH are strong candidates of neurodevelopmental diseases, reminiscent of the build-up of deleterious alleles documented across domesticated species.

David Hill, W., Arslan, R., Xia, C., Luciano, M., Amador, C., Navarro, P., Hayward, C., Nagy, R., Porteous, D., Mcintosh, A., Deary, I., Haley, C., Penke, L. *Contribution of rare genetic variants to intelligence and personality revealed by genomic analysis of family data*

Studies show that intelligence and personality are linked to fitness. Yet, heritable differences in these traits persist, an ostensible evolutionary genetic paradox. Pedigree-based analyses of intelligence and personality traits have reported that genetic differences account for 40-80% of the phenotypic variation. However, molecular genetic studies using unrelated individuals typically explain only around 30% of intelligence and between 0% and 15% of personality variance. Pedigree-based and molecular genetic estimates may differ because current genotyping platforms poorly tag variants with low minor allele frequency, copy number and structural variants. Using ~20,000 individuals in the Generation Scotland family cohort genotyped for ~520,000 single nucleotide polymorphisms (SNPs), we exploit the high levels of linkage disequilibrium (LD) found in members of the same family to quantify the effect of genetic variants not tagged in earlier studies. We control for the effects of shared environmental influences by modelling shared family, sibling, and couple effects.

In our models, genetic variants in low LD with genotyped SNPs explain over half of the genetic variance in intelligence, education and neuroticism. Such variants would be missed using current genotyping platforms on unrelated individuals. By capturing these additional genetic effects our models closely approximate heritability estimates from twin studies for intelligence and education, but not for neuroticism and extraversion. From an evolutionary genetic perspective, a substantial contribution of rare genetic variants to individual differences in intelligence, education and neuroticism suggests that they are likely under mutation-selection balance.

**15:10 – 15:40 Coffee & tea**

**15:40 – 16:40 Plenary Lecture 3 (Jean Jaurès)**

Johannes Krause - *The genetic history of Europe: Migration and Adaptation in prehistory*

Ancient DNA can reveal pre-historical events that are difficult to discern through the study of archaeological remains and modern genetic variation alone. Our research team analyzed more than 350 ancient human genomes spanning the last 10,000 years of Western Eurasian pre-history. We find direct evidence for two major genetic turnover events at the beginning and at the end of the Neolithic time period in Europe. Our data provide strong support of a major migration of early farmers spreading from Anatolia starting around 9000 years ago bringing agriculture and domestic animals to Europe. Following their arrival, early farmers genetically admix with indigenous Europeans in the course of the coming 3000 years. At the end of the Neolithic period, around 5000 years ago, we find the first genetic evidence for another major migration event of people from the pontic steppe, north of the black sea, into the heartland of Europe. The newcomers practice pastoralism, are highly mobile, due to the widespread use of horses, wheels and wagons and they may be responsible for the first spread of plague among human populations in Eurasia. We find that all modern European populations today are a genetic mixture of steppe pastoralist, early farmers and indigenous European hunter-gatherers in varying proportions. We furthermore find that due to genetic mixture and local biological adaptation there are major changes in human phenotypes such as eye color, skin color and the ability to digest milk sugar through the course of the last 10,000 years.

**16:40 – 16:50 Break**

**16:50 – 18:20 Poster session 1** \*see list below

**18:30 Wine reception**

## Friday, April 7th

### 9:00 Plenary Lecture 4 (Jean Jaurès)

Friederike Range, *The effect of domestication on cooperation*

Human societies depend on cooperation. Although it is clear that human collaborative skills are exceptional, animals are also known to collaborate with one another. Elucidating similarities and differences in the cognitive and emotional processes underlying cooperative interactions in non-human animals may help us to understand 1) socio-cognitive skills as adaptations to specific environments and 2) the evolutionary background and the origin of our own skills.

To investigate cooperation and its underlying mechanisms, researchers have mainly investigated our closest relatives – non-human primates. However, in some respects canids may be more informative model when investigating the evolution of human social behaviour and cognition. First, built on the assumption that dogs have been selected to cooperate with humans during domestication, it has been suggested that in a unique way domestication has equipped dogs with abilities necessary for cooperative problem solving. Second, wolves' social organization is similarly to that of early hunter-gather societies humans, making them a good model for human cooperative society in themselves.

In this talk, we will review current domestication hypotheses and present data on cooperation of human-raised but pack-living wolves and dogs. We will then discuss to what extent the different domestication hypotheses may explain differences between the two species.

### 10:00 – 10:50 Session 5: Animal social cognition (Jean Jaurès)

Jensen, K. *Working against unfairness – absence of disadvantageous inequity aversion in chimpanzees and bonobos*

**Objective:** An important component of human cooperation may be a sense of fairness. However, some studies have suggested that inequity aversion, particularly disadvantageous inequity aversion, may not be uniquely human. Evidence for this primarily comes from a token exchange paradigm in which subjects refuse to work for a reward if the partner gets a better one. A feature of this paradigm is that the interaction is between the subject and the experimenter. Subjects have no control over the outcomes for the partner; rejection increases, rather than decreases, inequity. Furthermore, the amount of work involved is trivial.

**Methods:** To address these concerns, chimpanzees and bonobos were given a novel task based on the successive negative contrasts (frustration) effect. Subjects worked on a lever pressing task which delivered the same rewards to themselves and a partner. After 10 days, subjects were then given 5 days of testing in which partners received an increase in both reward value and quantity.

**Results:** Chimpanzees and bonobos did not decrease effort in response to the surprising upshift in partner rewards. They continued to work for their own reward despite the added benefits for the partner.

**Conclusions:** It may be that the token exchange paradigm does not tap into disadvantageous inequity aversion. Even when work is effortful, there is no effect on sensitivity inequity. It may be indeed be the case that social comparison and a sense of fairness are uniquely important components for the evolution of human sociality.

De Las Heras, A., Sperber, D., Call, J. *Do chimpanzees and orangutans communicate in a cooperative task?*

Previous experimental studies show that captive chimpanzees (*Pan troglodytes*) and orangutans (*Pongo abelii*) cooperate with conspecifics but communication does not seem to play a crucial role. We presented a cooperative task in which pairs of conspecifics had to communicate to succeed. Participants faced each other from opposite sides of an apparatus playing either a communicator or an operator role. At the beginning of each trial, the communicator was provided with a tool that could only be used from the operator's side. Successful cooperation required that the communicator pass the tool to the operator and indicate the location of the baited tube so that the operator could insert it into the baited tube and food is delivered for both apes. In the experimental condition, only the communicator could see which one of four tubes was baited, while in the control condition both individuals had visual access to the baited tube. Data collection is currently ongoing. Participants are chimpanzees (5 male, 7 females; mean age= 18 years) and orangutans (2 males, 5 females; mean age= 19 years) housed at the Wolfgang Köhler Primate Research Center in Leipzig (Germany). So far, 10 dyads of chimpanzees and 8 dyads of orangutans have cooperated to solve the task. Preliminary results indicate that communicators typically transfer the tool near the location of the food and we have observed several kinds of potential communicative behaviors which are mostly directed to the food's location and produced when the partner is in proximity.

### 10:50 – 11:20 Coffee & tea

### 11:20 – 12:20 Speed session 6: Social cognition, communication and cultural transmission (Jean Jaurès)

Molleman, L., Glowacki, L. *Subsistence styles shape human social learning strategies*

Social learning is a fundamental element of human cognition. Learning from others facilitates the transmission of information, allowing innovations, behaviours and practices to spread within and between populations, and enabling individuals and groups to rapidly adjust to new environments. Moreover, the uniquely high fidelity of human social learning facilitates adaptive cultural evolution and the accumulation of complex technologies over time. While basic human propensities for social learning are traditionally assumed to be species-universal, recent empirical studies show that they vary between individuals and populations. Yet the causes of this variation remain unknown. Here we show that interdependence in everyday social and economic activities strongly amplifies social learning. With an experimental decision-making task we examine individual versus social learning in three recently diverged populations of a single-ethnic group in southwest Ethiopia, whose subsistence styles require varying degrees of interdependence. Highly interdependent pastoralists and urban dwellers have markedly higher propensities for social learning than independent horticulturalists, who predominantly rely on individual payoff information. We found no differences in preferential reliance on in-group social information over out-group information among any subsistence strategy. These results indicate that everyday social and economic practices can mould human social learning strategies and they highlight the flexibility of human cognition to change with local ecology. Our study further suggests that shifts in subsistence styles – which can occur when humans inhabit new habitats or cultural niches – can lead to reduced rates of cultural transmission and therefore compromise the ability of human societies to adapt to novel circumstances.

Mercier, H., Miton, H. *Evolutionarily valid cues to informational dependency*

Studies have shown that participants can adequately take into account several cues regarding the weight they should grant majority opinions, such as the absolute and relative size of the majority. However, participants do not seem to consistently take into account cues regarding whether the members of the majority have formed their opinions independently of each other. Using an evolutionary framework, we suggest that these conflicting results can be explained by hypothesizing that some cues are evolutionarily valid (i.e. they were present and reliable during human evolution), and others not. We use this framework to derive and test hypotheses about three facets of informational dependency. The first 10 experiments show that participants have the skills to adequately take into account cues to informational dependency when they are presented in a simple, evolutionarily valid way, although under low motivation conditions they might not always use these skills. Experiments 11 to 15 show that people consistently take into account shared motivation, but not shared cognitive traits, as a source of potential dependency, as predicted by the likely greater importance of differences in motivation during our evolutionary history. Finally, Experiments 16 and 17 show that people adequately discount opinions from sources with questionable trustworthiness, even when they converge with the opinions of trustworthy sources. This set of experiments suggests that participants can be quite skilled at dealing with informational dependency, and that an evolutionary framework helps make sense of their strengths and weaknesses in this domain.

Scanlon, L., Kendal, J., Tehrani, J., Lobb, A. *The cultural evolution of knot tying: an analysis of the cultural transmission of granny and reef knots*

Knot tying is a universal and ancient technology, therefore it is important to understand the learning biases that affect the cultural transmission of this simple technology in an aim to understand the evolution of technology in general. We present a mathematical model of the oblique transmission of the reef and the granny knot, which are two of the simplest knots, exploring the effect that given learning biases have on the successful reproduction of these knots. In conjunction with this model, we also present experimental data which tests the cultural transmission fidelity of tying both reef and granny knots. Using these data we evaluate the model using Approximate Bayesian Computation to generate probability distributions for the learning biases affecting the cultural transmission of knot tying, and explaining the prevalence of granny knots over reef knots. Our results show that knot transmission is affected by biases which cause a predisposition to tie a specific knot and to misinterpret the knot transmitted. Our data show that although there was a large tendency to accurately imitate the knot transmitted, the learning biases greatly affect the fidelity of transmission. This suggests that any biases in learning can affect the fidelity of transmission of technology, even if the technology is largely accurately transmitted, which may cause a great effect through cumulative cultural evolution, altering that technology.

Winters, J., Morin, O. *Emergence of optimal codes is contingent on the mode and function of communication*

One major puzzle in human biological and cultural evolution is the emergence of optimal codes of communication. Shaping these codes are a pressure to be functionally expressive and a pressure to reduce cognitive effort. An optimal code is therefore the most compressible set of form-meaning mappings capable of identifying the sender's intended meaning. Using a communication game setup, where participants play as senders and receivers, we experimentally simulate these two pressures to investigate whether the mode of communication (synchronous or asynchronous) interacts with the system's function (dyadic communication or individual mnemonic) in the emergence of an optimal code. Our rationale for looking at both mode and function is twofold: (i) optimal codes are more likely to emerge in dyads when used for synchronous communication, and (ii) optimal codes have a higher probability of emerging in asynchronous communication when used to communicate with oneself (mnemonic). 90 participants were recruited and placed into one of four conditions: Individual Synchronous (IS), Individual Asynchronous (IA), Dyad Synchronous (DS), and Dyad Asynchronous (DA). Only in DS do we consistently observe the emergence of optimal codes with a high success rate. Unexpectedly, codes in IA mostly converge on suboptimal solutions. These results suggest that code evolution is contingent on an interaction between both the mode and function. Furthermore, it seems for an optimal code to emerge, a system requires at minimum synchronous dyadic communication.

Müller, T., Morisseau, T., Winters, J., Morin, O. *The Influence of Common Perceptual Context on the Evolution of Graphic Codes*

**Objective:** Successful ostensive communication must rely on a body of shared information that has been called "common ground". The importance of common ground for referential communication has been extensively studied, but its impact on language evolution remains a moot issue. How important is shared information in the genesis of new languages through communication?

**Method:** We conducted a controlled laboratory experiment to answer the question of whether more common perceptual context between two interlocutors could help solving the task of establishing entirely new graphic codes, and using them for communication. In the experiment, the amount of perceptual context that dyads had in common was manipulated by minimising or maximising the portion of the reference space (consisting of different colours) seen by both participants.

**Results:** Our results show that participants solved the task by inventing new conventional codes, which vary widely between dyads. High common perceptual context leads to more success in this, and fosters the creation of richer codes.

**Conclusions:** The results contribute to explaining why codes for graphic communication are harder to learn and develop than those for oral speech, thus helping us make sense of a major puzzle of human behaviour: namely that oral or gestural language is a human universal, but graphic communication was imprecise for most populations in our evolution.

Lindova, J., Sedlova Malkova, G. *What do studies on grey parrots teach us about human verbal communication?*

**Objective.** Grey parrots are able to use words-like sounds and communicate with humans, including use of abstract concepts, answering questions and expressing requests by combining "words". "Word" use and social aspects of communication between grey parrots or other "linguistic" animals and humans point to specifics of human language acquisition.

**Methods.** We questioned 27 owners on their pet-grey-parrots' "word" production. "Word" production was consequently compared with early language acquisition by humans. We also performed a laboratory language-training study with two grey parrots and 49 trainers. Owners' and trainers' personality was measured by the NEO-FFI questionnaire.

**Results.** Pet parrots produced 0-256 "words", many of them context specifically. Greetings, names (of household members including the parrot itself), and food labels (e.g. food, water, nut) were among the first used "words". According to literature, these are also among the first words learned by children. Next, parrots learn conversational words and phrases (e.g. honey, give me a kiss), whereas children label animals and toys. Both pet parrots and laboratory trained parrots communicated more with humans who scored higher on agreeableness.

**Conclusions.** Both humans and parrots tend to first produce words that are used by their caregivers to contact them. Parrots seem to use their communication skills mainly to maintain social bonds with their caregivers, whereas children start early to communicate about objects other than food.

**12:20 - 13:20 Lunch**

**13:20 – 14:20 Parallel sessions 7A, 7B, 7C**

**Session 7A: Mating 2  
(Jean Jaurès)**

Lyons, M., Jones, A., Cook, R., Lacey, J. *Women's preference for Dark Triad male faces in short and long-term relationships: The roles of childhood safety and material inequality*

Previous research has found that women dislike facial characteristics of men high in the Dark Triad (i.e., Machiavellianism, narcissism, and psychopathy). However, there may be reproductive benefits for some women who prefer these characteristics in men, leading to increased number of offspring (Marcinkowska, Lyons, & Helle, 2016). In this study, we tested the idea that childhood relative poverty and neighbourhood safety have an association with a preference for the Dark Triad traits, possibly because these traits could indicate an increased resource-acquisition or protection ability.

In an on-line study, female participants filled in instruments on neighbourhood safety and perceived material inequality in childhood. Following this, they completed a 2-alternative forced choice task, choosing between high and low Dark Triad males as long-term ( $n = 195$ ) or short-term ( $n = 184$ ) partners.

Overall, women had low preference for high Dark Triad male faces, irrespective of the mating context. However, when evaluating faces as long-term partners, neighbourhood safety in childhood was a significant positive predictor of preference for psychopathic male faces.

Our findings indicate that material inequality in childhood does not have an influence on mate choice for manipulative male faces, but childhood physical security (i.e., living in a safe neighbourhood) has an impact on a preference for psychopathic faces. The results are discussed with a reference to environmental influences on women's mate choice.

## Fortunato, L., Clauset, A. *Revisiting the effect of red on competition in humans*

Bright red coloration is a signal of male competitive ability in animal species across a range of taxa, including non-human primates. Does the effect of red on competition extend to humans? A landmark study in evolutionary psychology established such an effect through analysis of data for four combat sports at the 2004 Athens Olympics (Hill & Barton 2005). We show that the observed pattern reflects instead a structural bias towards wins by red in the outcomes of the competition. Consistently, we find no effect of red in equivalent data for the 2008 Beijing Olympics, which present a structural bias towards wins by blue. These results refute past claims of an effect of red on human competition based on analysis of this system. In turn, this undermines the notion that any effect of red on human behavior is an evolved response shaped by sexual selection. Results from the largest test of the effect to date, based on outcomes of contests in an online game, support this conclusion.

## Maestripieri, D. *Morningness / eveningness as a human life history trait*

Morningness/eveningness (i.e., chronotype) is a trait that shows a normal distribution in human populations, with early birds and night owls at the two extremes of the distribution. Chronotype differences are moderately heritable, indicating the potential for selection. Phylogenetic and ecological data from nonhuman primates suggest that morningness was probably the human ancestral condition. Evidence that night owls score higher than early-morning people in extraversion, impulsivity, novelty-seeking, and sexual promiscuity suggests that eveningness may have evolved to facilitate short-term mating strategies. We tested the hypothesis that inter-individual variation in morningness/eveningness reflects variation in life history strategies such that early birds exhibit traits typically associated with slow life histories while night owls exhibit traits typically associated with fast life histories. Male and female night owls exhibited significantly greater general risk propensities than early birds. Furthermore, the future orientation of morning-types was causally related to their long-term mating orientation and relatively low sexual experience, while the present orientation of evening-types was causally related to their short-term mating orientation and greater sexual experience. Male night owls also scored significantly higher on the Intrasexual Competition Scale (ICS), a questionnaire that measures the attitude toward same-sex competition in the context of mating. Finally, we compared cortisol and testosterone responses of night owl and early-morning males to socially stressful and sexually arousing stimuli. Our results suggest that hormonal responses to social and sexual stimuli are among the physiological mechanisms linking the psychological characteristics of early birds and night owls with their distinct patterns of sociosexuality.

## Session 7B: Archaeology (Théodule Ribot)

### Jarecki, J., Kellberg Nielsen, T., Riede, F., Bach, L., Johannsen, NN., Lombard, M. *Stone Age bow hunting as a robust strategy for human expansion: a computational model*

Repeated range expansions and one-way dispersals characterize *Homo sapiens*. Expansion could have been facilitated by changes in climate, or by new subsistence techniques, which enabled survival in less viable areas. However, the resource conditions in new areas can be unpredictable, and subsistence techniques that are successful in a current location may not be effective in new environments. We investigate how resource predictability impacts the use of two Stone Age hunting techniques, spear hunting and bow hunting, and the development of group sizes in hunter-gatherer groups. We hypothesize that given unpredictable resources, bow hunting facilitates niche broadening and supports survival in smaller groups, although bow hunting constitutes a rather low-gain strategy with high material costs. Spear hunting, which constitutes a comparably high-gain hunting strategy, is hypothesized to be more vulnerable to change in environmental resources. Using computational modelling in the form of hierarchical individual-based simulations with evolutionary transmission dynamics, with parameter constraints derived from archaeological data, we show that under stochastic climatic circumstances groups of bow hunters survive longer and therefore can disperse further compared to spear hunting groups. However, spear-hunting groups fare better in highly predictable (unchanging and fertile) environments, whereas the relatively low-gain bow outperforms the spear particularly in uncertain situations. We conclude that, especially for small group sizes in variable environments, low-risk, low-gain subsistence strategies such as bow hunting were key to human expansion.

### Kristian, T., Fusaroli, R., Heimann, K., Gonzalez, S., Lombard, M., Fay N., Johannsen, NN., Riede, F., Roepstorff, A. *Perceptual and symbolic adaptations in prehistoric symbolic behavior*

Recently, there has been a great interest in connecting archeological findings to knowledge and hypotheses about cognitive evolution including the evolution of language. Among the evidence discussed are line carvings, as they can be found in stone and ostrich shells dating back as long as 100 ka. It has been suggested that developments in line patterns over time are related to adaptations for potential symbolic value and function (Christopher S Henshilwood, d'Errico, & Watts, 2009; Christopher S. Henshilwood et al., 2011; Hodgson, 2014; Texier et al., 2013). In a series of experimental studies, we investigate whether the development of early line patterns stretching over a period of approx. 70.000 years is an expression of an adaptive process of functional optimization for human perception and cognition, that is, if line carvings evolve over time to become more salient, reproducible, intentionally expressive and memorizable. We will present evidence from four experiments using engraved line patterns from early archeological records as stimuli to test a set of related hypotheses: 1) Later patterns are more perceptually salient than earlier ones, 2) later patterns are easier to remember and reproduce than earlier ones, and lastly 3) later patterns are more likely to be experienced as intentionally produced by a human with an aesthetic/symbolic purpose. Results suggest that the archeological findings indeed show traces of adaptive development with later patterns being more perceptually salient, easier to remember and more likely to be interpreted as intentionally produced than earlier patterns.

### Kratschmer A., Lombard M. *Tracking strategies and hunting technology as beacons for the emergence of symbolic thinking*

We will attempt to trace a plausible time-lined scenario for the emergence of symbolic thinking using the archaeological record of hunting technology as well as knowledge about modern tracking strategies as a beacon. Based on Deacon's account of the semio-cognitive hierarchy of Peirce's tripartite taxonomy of signs (icon, index and symbol), as well as the environmental (copious repetition) and cognitive prerequisites (syllogistic reasoning, indexical thinking) for these evolutionary steps, we will investigate to which point we can apply these notions to Liebenberg's taxonomy of tracking strategies: systematic and speculative tracking.

It appears conceivable that systematic tracking was in the cognitive range of pre-linguistic hunters, as it builds on indexical reasoning, a capacity present in many higher animal species.

Based on Donald's account of symbolic communication being chronologically preceded by mimetic communication (which is inherently iconic and indexical), we will hypothesize that pre-linguistic hunter cultures were engaged in mimetic communication, resulting in some "language pioneers" (Galantucci) developing abstract categories and names for them, i.e. symbols.

With the symbolic system in place, speculative tracking with all its cognitive and social prerequisites (teaching, dialogical deliberation) and its associated weapons (bow-and-arrow) became possible.

## Session 7C: Social Cognition and Cooperation (Paul Langevin)

Tan, J., *From Error Costs to Error Probability: Modeling Error Management in Social Decisions*

**Objective:** According to error management theory, cognitive biases are adaptations that promote good decisions under uncertainty. Most research has focused on demonstrating how the *cost* of errors influences bias, often overlooking the impact of the *probability* of errors. Whether false-negatives or false positives are more probable is indicated by the base-rate and should also impact the decision bias adopted. I will present a study that shows how both the cost and the probability of errors jointly impact biases in a social decision, and how this can be tested using cognitive modeling.

**Methods:** Participants made hypothetical decisions about whether they would forgive their relationship partner. Each decision trial featured a different combination of four relevant cues (i.e., whether the partner intended to harm, apologized sincerely, and had done something similar before, as well as whether the incident was serious). Each participant's perceived cost-of-errors and base-rate were measured using surveys. The decisions were modeled using a simple lexicographic heuristic as well as a weighing-and-adding model in order to estimate each participant's bias.

**Results and Conclusions:** Regression analyses showed that error costs and error probability separately and jointly predicted the decision bias adopted. This demonstrates how cognitive models enable fine-grained error management predictions to be tested. Furthermore, by going beyond cost to study base-rate, the study hopes to build a fuller picture of how cognitive adaptations for managing errors promotes fitness.

Ruth Mace, Matthew Thomas, Jiajia Wu, Qiaoqiao He, Ting Ji, Yi Tao Tag-based reputation is associated with fitness costs and exclusion from cooperative networks

The problem of how humans evolved to cooperate with unrelated individuals has many possible solutions, but reputation is thought to be important. A good or bad reputation can determine who will cooperate with you. Competition for helpers or mates can theoretically result in the evolution of strategic cooperation with friends and allies, and also the derogation of competitors. Whilst tag-based cooperation might be another possible mechanism at work. However much of the evidence for reputation determining cooperative networks is from theoretical models or lab experiments. Here we show a real world case, from a farming community in Southwest China, where a bad reputation (known as *zhu*, associated with supernatural activity including poisoning food) is associated with fitness costs, and exclusion from mainstream networks; but it also predicts assortment into networks with others so accused. Methods: Based on the demographic and socio-economic surveys, spot observation of people's working on the farm and a gift game, we used Poisson regression and Zero-Inflated Poisson (ZIP) regression model for our data analysis. Results and conclusion : We find that households containing people considered as *zhu* were less likely to receive or give gifts or farm help, from or to non-*zhu*; and those in non-*zhu* households were unlikely to report partnerships or children in households considered *zhu*. However *zhu* households did preferentially help each other.

Moffat-Knox, B-D. *It's nicer to be nice when it serves our prosocial reputation: a study of blood donor warm glow*

When individuals perform a prosocial act they often report feeling an intrinsic positive emotional response known to economists as 'warm glow'. This study investigated the relationship between this proximate mechanism of prosocial behaviour and an ultimate explanation; prosocial reputation building. According to the competitive altruism hypothesis individuals compete for access to profitable partnerships through the development of prosocial reputations. We measured self-reported warm glow and potential offline and online reputational gain in 145 blood donors following a voluntary blood donation at Newcastle's Blood Donor Centre. We found that warm glow intensity was significantly positively associated with donors' offline reputation network size after controlling for total social network size. We also find that donors, who advertised their blood donation using online social media, experienced a significantly higher warm glow than donors who do not use social media and donors who had no plans to advertise their blood donation on their social media accounts. These findings suggest that blood donors feel a greater intensity of warm glow when their prosocial behaviour is advertised to more individuals within their offline and online social networks. We conclude that warm glow may have evolved as a reward mechanism to reinforce prosocial behaviour which develops or maintains our prosocial reputation.

## 14:25 – 15:15 Session 8 (Jean Jaurès): Social cognition in the digital age

Morrison, E., Rich, J., Cox, J., Nguyen, T. *Crowdfunding: do looks matter?*

**Objective:** Attractive people tend to earn more money, especially men (the attractiveness premium). The present study exploited a natural field experiment to investigate the attractiveness premium in crowdfunding, whereby money is raised for a project from contributions from a large number of people. As well as attractiveness, we measured perceived trustworthiness and dominance as these are the major dimensions of social perception, and are plausibly related to investment decisions (as dominance is closely linked to competence).

**Methods:** 115 equity crowdfunding projects were prospectively tracked on the CrowdCube platform, which collectively raised a total of about £38 million (median £139,435 per project). Attractiveness, perceived trustworthiness, and perceived dominance of the entrepreneurs was measured by taking the photographs or stills from videos on the project pages and having them rated by 10 independent raters.

**Results:** Contrary to the attractiveness premium, attractiveness did not predict reaching the funding target or the total amount of money raised. However, perceived trustworthiness did predict reaching the funding target (but not perceived dominance). There was also a negative effect of being female, but no interactions between ratings and sex.

**Conclusions:** This is the first research to our knowledge to analyse the impact not only of attractiveness but also other aspects of appearance on economic outcomes in crowdfunding. These data suggest that physical appearance is linked to raising money from the public, but trustworthiness might be more important than dominance or attractiveness. It is also possible that trustworthy looking people actually developed objectively better projects.

Davis, A., Mac Carron, P., Cohen, E. *Buffering effects of social cohesion and support during exercise*

Evidence from across the behavioral sciences indicates an association between group physical activity and social cohesion in humans. Recent research on endogenous pain modulation has shown that social support produces analgesic effects on externally induced pain, suggesting that social environments may affect optimal responses in evolved self-regulatory mechanisms involved in pain and physical discomfort more generally. Here we use multiple research methods to test the hypothesis that social support and cohesion act as a social buffer to signals of pain and (neurologically similar) fatigue during physical exertion, ultimately leading to increased outputs. In a study using 'big data' from parkrun – an international organization offering free, timed 5 km runs in public spaces – we investigated whether running with 'friends' (frequent running partners) improves run times. In a follow-up, survey-based study, we asked participants about their social and running experiences at parkrun over a four-month period. Our analyses of over 5 million runs at parkrun suggest that the stronger the relationship(s) between individuals and their running partner(s) on a given day (i.e., the more times they had previously ran together), the faster their 5km running times. This relationship held while controlling for age, gender, individual differences in running ability, and the amount of previous runs at parkrun. Our survey results back up these findings. In a multilevel mediation analysis we found that participants who reported attending a parkrun event with their friends or family ran faster over 5km as a result of feeling more energised by the parkrun community.

**15:15 – 15:45 Coffee & tea**

**15:45 – 16:45 Session 9 (Jean Jaurès): Social heuristics**

Safra, L., Baumard, N., Chevallier, C. *Are people actually choosing a leader when asked to do so?*

How do people choose their political leaders is one of major question in modern democracies. Based on the importance of perceived competence in voting behavior and inspired by the anthropological literature, we cast doubts on the standard interpretation according to which people choose the individual who would be the best leader for the group. Rather, we put forward the idea that, when asked to choose a political leader, people actually choose who they think is the fittest individual in the environment in which they are living. This selection-of-the-fittest theory explains why, in peaceful times, people choose trustworthy and less dominant individuals who are likely to federate and put the interest of the group above their own, while in difficult times they choose dominant, non trustworthy and non cooperative individuals who may be particularly damaging for their group. This approach has a range of implications for the understanding of political behavior. In particular, it suggests that the perception of voters' current environment is more important for predicting the election than their perception of the political needs of their country.

Van Den Berg, P., Wenseleers, T. *Uncertainty about social interactions leads to the evolution of cooperative heuristics*

Humans are a social species, engaging in many different kinds of social interactions over their lifetimes. However, they may not always be able to accurately assess the exact nature of the social situation they find themselves in. For example, they may not be sure whether investing effort in a group project will eventually result in a net cost or a net benefit to themselves. Evolutionary approaches to understanding human behaviour have often neglected this uncertainty, instead aiming to identify the behaviours that we should expect to evolve in some specific social context (such as the Prisoner's Dilemma game). In this study, we develop a model with the aim to understand the evolution of human social behaviour under more uncertain circumstances. We simulate a population of individuals that engage in a wide range of different cooperation interactions, and systematically vary the degree of uncertainty that individuals have about the nature of the interactions they are engaged in. We find that relatively high uncertainty leads to the evolution of simple strategies that disregard some of the available information ('heuristics'). Moreover, the heuristics that evolve under high uncertainty are more cooperative than the relatively sophisticated strategies that evolve under less uncertain conditions. These results can help us understand why humans sometimes cooperate in situations where this would not be expected when considering these situations in isolation. More generally, this study provides insight in how evolution can lead to the emergence of simple strategies that are applied across a wide range of social contexts.

**16:45 – 17:00 Break**

**17:00 – 18:30 Poster session 2** \*see list below

**19:30 Conference dinner\* (La Barge) and Best Poster Awards**

## Saturday, April 8th

### 9:00 Plenary Lecture 5 - Young Investigator Award (Jean Jaurès)

Urszula Marcinkowska - *La donna è mobile (?). Digressions on hormones and women's sexual preferences and activity.*

There is a large amount of studies published on changes of women's preferences throughout menstrual cycle. Although idea of increased masculinity, symmetry and dominance preference around fertile days is not recent, a consensus on whether and why such increase could exist is still lacking. My last 2 years of work have been concentrated around providing further evidence for this discussion, based on detailed hormonal measurements in a considerable large (in such type of study design) sample size.

One hundred and two women from 2 localisations (rural and urban) participated in the study. They collected daily saliva samples, conducted fertility tests and attended 3 surveying meetings. Each meeting was meticulously planned based on real menstrual cycle length and ovulation detection via urine tests. We obtained data from three phases of the cycle – early follicular, around ovulation (high conception probability) and late luteal (low conception probability). On each meeting women were photographed, measured and asked to complete a visual task with pictures of men's bodies and faces with varying masculinity, symmetry and hirsuteness. For each participant both average and daily levels of progesterone, testosterone and estradiol were measured.

We found no relation of daily hormonal levels and masculinity and symmetry preference. We found a negative relation between average progesterone levels and facial masculinity preference, but only among women in long-term relationships. There was no relation between facial masculinity preference and neither of the estradiol measurements.

We also did not find cyclical, intra-individual shifts in women's masculinity, beardedness or symmetry preference. Results of our study further suggest that overall cycle levels of sex hormones (namely progesterone) are better predictors of masculinity preference, than daily fluctuations. As the project is ongoing, multiple analyses are still being conducted.

With results of this project I would like to direct attention towards importance of in-depth hormonal measurements (due to individual cycles variability) and conducting studies of women's preferences shifts on samples big enough to allow controlling for confounding variables, such a relationship status or sexual openness.

### 10:00 – 10:50 Session 10: Sexual coercion and polygyny (Jean Jaurès)

Alger, I. *How many wives do men want? On the evolution of polygyny rates*

Why are some societies monogamous and some polygamous? The question matters for all the reasons that families themselves matter: investment in children, reproductive skew, gender differences in well-being, and more. Most theories of polygyny invoke male heterogeneity as a key driving factor. I argue that such heterogeneity itself depends on men's willingness to compete against each other to acquire more wives. I derive the preferences of ex ante identical men over polygyny rates by focusing on evolutionary fundamentals. Preferences are shown to depend on exogenously given factors such as the cost of producing food and care, and the technology of defense. I find that men never prefer intermediate numbers of wives: depending on the ecology, a man either always benefits from having more wives, or he prefers both strict monogamy and high polygyny rates to intermediate polygyny rates. Hence, depending on the ecology evolution should lead either to monogamy, or to a significant amount of polygyny.

Baniel, A., Cowlishaw, G., Huchard E. *Sexual coercion in a promiscuous primate society*

Sexual violence is frequent in humans but its evolutionary origins remain speculative, because few animal studies have investigated the existence, mechanisms and intensity of sexual coercion. Here, we tested whether male aggression towards females represents sexual coercion in the promiscuous societies of wild chacma baboons (*Papio ursinus*). We found support for all three main predictions of the sexual coercion hypothesis: male aggression (1) is greatest against fertile females, (2) represents the main source of injuries for females, and (3) increases male mating success with their victims on the long-term. Detailed investigation of behavioural sequences using a matched-control approach further shows that aggression and matings are temporally decoupled, explaining why sexual violence may have gone unnoticed for decades in well-studied animal populations despite its important impact on the fitness of both sexes. Finally, we found no support for alternative hypotheses such as a female preference for aggressive males. This new, detailed study of the forms, intensity and fitness consequences of sexual coercion in a wild primate suggests that it may be widespread across mammalian societies, with important implications for understanding the evolution of mate choice in mammals, as well as the origins of human sexual violence.

### 10:50 – 11:20 Coffee & tea

### 11:20 – 12:20 Speed Session 11: Culture

Morin, O., Miton, H. *A cultural attraction model predicts the frequency of heraldic shield types with precision*

**Objective:** According to cultural attraction theory, the frequency of a cultural type can be influenced by the frequency of neighboring types. This study reports a case where the frequencies of cultural items are predicted by the frequency of types that resemble them, with little detectable effect of type imitation.

**Method:** A simple model was constructed to predict the frequency of 796 types of heraldic coats of arms, using data from a collection of Renaissance and Early modern European arms of these types ( $n = 7569$ ). Each type consists in an abstract pattern combined with one background and one foreground tincture. Our model stipulates that the frequency of any single type is a simple function of the frequency of its component pattern and of its particular combination of foreground and background tinctures. These frequencies are calculated on a set of arms that never included the target type itself.

**Result:** This simple model predicts the absolute value of types with accuracy (correlation between predictions and reality: Spearman's  $p = .72$ ), coming for most types within 50% of their actual value. Very few types are significantly more frequent than predicted (but many types are less frequent than predicted).

**Conclusion:** The predictive success of this straightforward model suggests that heraldic shield types owe most of their diffusion not to direct imitation, but to an original generative process: the elements that composed them were, it seems, randomly reshuffled to create new coats of arms.

Miu, E., Rendell, L. *The role of recombination in cumulative culture*

Human culture is uniquely cumulative – we build on the accomplishments of previous generations, which leads to a tremendous accumulation of knowledge and skill that persist over time. Although the role of recombination has been widely recognized as central to cumulative culture, there has been little empirical investigation of this process. Here we aim to investigate recombination in a realistic setting using a large-scale dataset collected as part of a long-standing collaborative programming competition.

We analysed the evolution of computer code from 20 competitions, consisting of a sample of approx. 50,000 entries. Entries were completely public and participants could copy, modify, and combine any previously submitted entries, such that each contest was a microcosm of cumulative cultural evolution. We quantified recombination at the population level using a line-based measure, by tracking each line of code back to its initial submitter. This allowed us to characterize each entry in terms of the number of original parent entries, which the entry now is a combination of. Results show that, with time and as solutions become increasingly harder to improve upon, the population engages in considerable copying, which results in an accumulation of recombination. Longer and later entries show a larger number of original parents, which is positively correlated with performance. Therefore, in this context, solutions become more effective as they build on increasingly more sources overall, but this raises questions regarding the identity and the adaptive value of the individual level decisions that lead to this population-level pattern.

Duda, P., Minocher, R., Zrzavý, J. *Phylogenetic supertree of human populations as a tool for testing hypotheses about human ecological and cultural adaptations through cross-cultural comparison*

Anthropologists regularly employ comparative approach to study cultural evolution, to recognize, test, and interpret adaptive patterns and processes in human behavior and culture. A robust phylogenetic framework is needed to control for the effect of shared ancestry or "phylogenetic

"signal" on behavioral and cultural similarities between human populations. In anthropology, this has long been known as phylogenetic non-independence or "Galton's problem". Efforts have been made to mitigate Galton's problem, most notably by creating the Standard Cross-Cultural Sample (SCCS), a sample of 186 populations relatively culturally independent from each other. Nonetheless, there is still serious non-independence among the populations in the SCCS. Modern phylogenetic comparative methods allow to control for phylogenetic non-independence with the use of phylogenies. Until now, cross-cultural studies that utilized these methods have been limited to small samples of populations for which genetic data were available, or to language families such as Bantu, Indo-European, and Austronesian for which well-resolved phylogenies based on lexical data were available. Thus, the wealth of data encompassed in large cross-cultural samples is yet to be analyzed. We utilized the "matrix representation with parsimony" (MRP) method to infer a time-calibrated supertree of populations included in the SCCS, based on 375 genetic and linguistic phylogenetic trees from 245 studies published in 1990–2016. This supertree can provide a useful tool for controlling for and quantifying phylogenetic signal, reconstructing ancestral states, detecting correlated evolution and inferring mode and tempo of cultural evolution on a global scale.

### Watts, J., Sheehan, O., Bulbulia, J., Gray, R., Atkinson, Q. *Greater political hierarchy predicts faster conversion to Christianity*

Over the past 2,000 years Christianity has grown from a small Judaic cult to the world's largest religious family. Scholars debate whether Christianity has spread through a top-down process driven by political leaders, or as a bottom-up process that empowers social underclasses. While there is insufficient data to test between these theories in Ancient Rome the spread of Christianity in Austronesian cultures was well documented, they had a range of social structures and their reactions to missionaries varied substantially. Here I present a PGLS spatial approach and test whether political structures and social stratification predict the length of conversion across 60 Austronesian cultures, whilst addressing the potential effects of the common ancestry and geographic proximity of cultures. Fitting with a top-down process, conversion occurred fastest in cultures with over-arching political hierarchies. By contrast, I find no effect of social stratification which fails to support the bottom-up theory of conversion. These results show that political hierarchies can facilitate the rapid dissemination of ideologies, and how missionaries have been able to use this to spread Christianity globally.

### Minocher R., Duda P., Jaeggi A. *Non-independence in the SCCS: polygyny and the effect of cultural history.*

The Standard Cross-Cultural Sample (SCCS), long used to test patterns of variation in human behaviour, was previously thought to address non-independence (Galton's problem) in cross-cultural research. However, significant autocorrelation in half the SCCS variables with language and distance suggest populations with similar linguistic histories or in close spatial proximity may share traits due to ancestry, rather than local ecology. It may thus be important to control for phylogenetic history – especially for traits that have likely been shaped by cultural histories. Human marriage practices are diverse, yet polygyny is particularly prevalent and widespread. The evolution of polygynous marriage has been investigated extensively in the SCCS – correlated with local ecology, e.g. climate, pathogen stress, resource control, and warfare. However, previous studies have ignored linguistic, genetic or spatial relationships between societies, assuming non-independence. With an approach borrowed from quantitative genetics, we will quantify the relative roles of (i) cultural history, (ii) horizontal cultural exchange and (iii) local ecology, in explaining the distribution of polygyny. In our model, cultural history is represented by a genetic and linguistic supertree of SCCS populations, cultural exchange by a spatial distance matrix, and local ecology by variables found to explain polygyny in the SCCS in previous studies; relative roles are defined by the amount of variance in polygyny explained by each component. By repeating previous studies with these phylogenetic controls, our project examines the severity of non-independence in cross-cultural research – while further exploring the degree of plasticity and phylogenetic inertia in a complex behavioural trait.

### Palomo-Vélez, G., Tybur, J., Van Vugt, M. *What information affects meat attitudes? Testing an evolutionarily derived intervention*

Modern, Western dietary habits contribute to cardiovascular diseases and cancers and the depletion of natural resources. Excessive meat consumption specifically contributes to these ills. From an applied evolutionary perspective, what types of information might be effective in motivating people to change their meat consumption habits? In the current investigation, we examined the effectiveness of three types of persuasive messages intended to decrease motivations to consume meat. The first two are commonly used by organizations targeting meat reduction, and they highlighted (1) the negative long-term health consequences of meat consumption or (2) the moral hazards of the meat production system. The third was inspired by animal behavior and evolutionary psychology research showing that meat aversions are acquired through immediate sensory experiences of illness or disgust, and it highlighted disgust eliciting aspects of the meat production system. Results across two studies suggested that a disgust-oriented persuasive message was most effective in influencing desires to eat meats, showing the value of adopting an evolutionary approach to health and environmental interventions.

## 12:20 - 13:20 Lunch

### 13:20 – 14:10 Session 12: The evolution of cooperation (Jean Jaurès)

#### Roberts, G. *Helping others can be an honest signal of cooperative strategy (rather than quality) in partner choice*

By helping others, people may not simply be transferring benefits, but may be investing in a good reputation. But why should people believe that such displays honestly indicate that the signaler would make a good social or sexual partner? Previous approaches have suggested we help those who help others (indirect reciprocity), or that helpful reputations advertise signaler quality (resources). Here I propose instead that reputation-building signals cooperative strategy (intentions) to potential partners. I present a model in which individuals first had an opportunity to invest in a reputation by performing a unilateral helpful act. Observers could then decide whether to use this behaviour in choosing an alliance partner. When pairing, it was assumed to be beneficial to obtain a partner who would go on to cooperate. I found that over evolutionary time, individuals evolved to invest in reputation building; to choose partners based on their reputations; and to then engage in mutual cooperation. Helping others unconditionally evolved into an honest signal of commitment when it was strategic for cooperators (but not defectors) to invest in the long term benefits of a good reputation. This fundamental difference between cooperative and defecting strategies gave rise to an overlooked mechanism for honest signalling based on reputation, in which helping others reliably signals future intentions (as opposed to quality). I relate this to previously presented experimental results in which individuals use strategy rather than quality in choosing partners. Reputation-based signaling offers a potential explanation for phenomena including philanthropy, collective action, punishment, courtship and advertising.

#### Međedović, J. *Interpersonal and affective psychopathy features can be adaptive in evolutionary context*

Psychopathy is a complex multi-faceted trait, often described as a personality disorder. It is related to various amoral, antisocial behaviors and socially undesirable outcomes. Psychopathy is often operationalized as a compound of interpersonal manipulation, callous affect, impulsive lifestyle and antisocial behavior. Some scholars tried to study psychopathy using the evolutionary framework, however, its' evolutionary status is still unclear. There are findings that psychopathy is related to various declines in physical and mental health which can lead to decrease in fitness. However, there are some empirical data suggesting that psychopathy is related to heightened sociosexuality and mating effort and thus it could enhance fitness. We tested these contrasted hypotheses in three different samples (Ntotal=491), using different operationalizations of psychopathy. We analyzed the relations between psychopathy and reproductive success, as a crucial fitness indicator. Positive relations between manipulative psychopathic characteristics and reproductive success are detected in all three studies. There were indications that affective callousness can be adaptive in unfavorable and detrimental environmental conditions. Finally, the data suggested that impulsive and antisocial psychopathy traits are negatively related to fitness. The results provide new insights to the concept of psychopathy, especially the status of psychopathy as a psychological dysfunction and the evolutionary genetics of psychopathy.

### 14:10 – 15:10 Plenary Lecture 6 (Jean Jaurès)

#### Rebecca Bliege-Bird - *Sharing as competitive aggrandizing or prosocial signal? Costly signaling in hunter gatherer social strategies*

Costly signaling has been implicated in mechanisms that facilitate cooperative social interaction, one of which is honest demonstrations of generosity. However, much of this work has interpreted generosity as 'competitive altruism', which tends to obscure the different forms that generosity takes, and how signaling costs and benefits are paid. If generosity is about competitive aggrandizing, we can explain how a named

university endowment prominently displayed on a building enhances the status of the donor, or how a big game hunter advertises his skill and garners deference through sharing widely, but it is difficult to explain the costly austerity of some individuals who refuse to engage in competitive aggrandizing (eg give anonymous donations to charity), the costly giving of those who donate a high proportion of their income, or the economically puzzling practice of sharing small, easily acquired and low risk food items that everyone already possesses (fruit, vegetables, small animals and fish). If generosity is only about competitive aggrandizing, it is also not clear how displays of generosity might lead to more cooperative interactions, as it seems to do in many experimental games. Overt boasts of skill seem incompatible with the trust required for cooperative interactions. In this talk, I draw on my ethnographic fieldwork in Australia to explore the role that generosity plays in generating trust, the varied signaling benefits of sharing, and how sharing/signaling varies with aspects of the environment and signaler goals.

**15:10 – 15:30 Coffee & tea**

**15:30 EHBEA Annual General meeting (Jean Jaurès)**

## Poster session 1 (Thursday, April 6<sup>th</sup>)

1. Is parenthood status associated with relationship quality between siblings? Tanskanen Antti Olavi & Danielsbacka Mirka

**Objectives:** When a niece or a nephew arrives the shared reproductive interests between siblings become more active than before, which may encourage individuals to invest resources in their siblings with children. In addition, similarity in life history stage (e.g., becoming a parent) might affect sibling relations. However, there is a lack of studies investigating whether parenthood is associated with relationship quality between adult siblings.

**Methods:** Using Generational Transmissions in Finland survey ( $n = 1,530$  younger adults), we investigate whether parenthood status is associated with sibling relationship quality measured by contact frequency, emotional closeness and conflicts. We applied multilevel regression models, which take into account the non-independence of sibling relationship quality measures reported by the respondents.

**Results:** We found that females who are mothers themselves reported more contact with sisters compared to childless women. We also found signs of decreased likelihood of conflict among sisters with children. Fathers reported more contact than childless men with their childless sisters. In contrast, compared to childless men, fathers reported less contact and a lower level of emotional closeness to their brothers.

**Conclusions:** Our results are partly in line but partly in contrast with predictions derived from the shared reproductive interest and life history similarity perspectives.

2. The Altruistic Bully: Effects of within-group rank heterogeneity on cooperation during competition. Hristov Hristo

How does within-group hierarchy explain group success during inter-group competition? Theoretical work (Gavrilets & Fortunato, 2014) has predicted that high-rank individuals within groups, who earn a disproportionate amount of resources, are more likely to contribute more for the group's success than low-rank individuals. Moreover, high-rank individuals are likely to earn less than low-rank individuals from the entire interaction during between-group competition.

To test this seemingly altruistic effect we devised a behavioural laboratory experiment with 192 UK participants within the contest game paradigm. The main finding partially confirmed the theoretical prediction. High-rank players in the game indeed contributed more to the group's success. However, when the group was in a between-group competition, their net earnings from the game were indistinguishable from the net earnings of individuals of lower rank. More findings regarding the performance of egalitarian groups in the same setting and gender differences will be discussed.

3. The Influence of Rule Origins On Fostering Rule Abidance. Karabegovic Mia, Heintz Christophe

Prosocial rules are instructions about how to behave: their function is increasing social welfare, and they can take the form of specifications about due contributions to the common good. They are pervasive in human society and abiding by them is crucial to many social enterprises. What motivates people to follow rules even at a material cost? Our study shows that one factor that modulates rule following is people's understanding of the process through which it is formed and asserted. We use a design which affords various modes of incorporating rules preceding a 10-round Public goods game. In one condition, the prosocial rule is asserted as the result of a democratic vote: participants choose from five offered contribution rules as a guideline for how players in the session should behave. The rule most voted for is 'contribute 100% of your endowment': it is displayed as the voted-for rule at the beginning of the PGG, but compliance is neither enforced nor enforceable. Our results show that, following a democratic vote, a significantly higher proportion of players contribute their whole endowment than in the baseline, where the rule is to contribute whatever one wants, but the rate of overall cooperation in the later stages is not affected. Subsequent sessions will include stating the rule by leaders that are either randomly selected, selected through justifiable means, demonstratively benevolent and demonstratively interested. The study thus analyses how rule abidance is modulated by its perceived legitimacy as derived from the process of its formation and source.

4. Can you smell the winner? The effect of winning and losing on human body odour. Fialová Jitka, Třebícký Vít, Havlíček Jan

**Objective :** The results of previous studies indicate that human body odour can provide relevant information about various affective states like stress, anxiety or happiness of other individuals. Moreover, body odour collected during competition elicits higher skin conductance response compared to non-competitive context. Here, we investigated whether winning and losing a match will influence hedonic valence of body odour. We employed mixed martial arts (MMA) as a model of real-life physical encounters.

**Methods :** We collected body odour samples from 39 MMA fighters before and after their fight during four rounds of Czech Amateur MMA league. Body odour was collected for 30 minutes on cotton T-shirts. Obtained stimuli were subsequently rated on a 7-point scale regarding their pleasantness, attractiveness, and intensity by 140 raters (31 males). The ratings did not differ between the sexes and therefore, they were analysed together.

**Results :** We found significant differences in body odour samples collected before and after the fight in individuals who lost their fight. Their body odour was rated as less attractive after the fight. In contrast, there was no change in odour attractiveness in the winners. Further, no similar pattern was observed in pleasantness and intensity.

**Conclusions :** Our results show significant effect of competition outcome on perceived quality of human body odour. These results might be due to the differences in affective states which were previously shown to affect the quality of body odour.

5. Prestige networks in the Royal Navy: the role of distributed informal networks in complementing status hierarchies. Offord Matt

Traditional leadership theory assigns leadership outcomes, such as team performance, to the traits of single leaders. As leadership scholars move away from this approach, evolutionary behaviour approaches, such as Evolutionary Leadership Theory, are helping to reshape our view of leaders by asking, why do we need leaders in the first place? This approach suggests that humans are ambivalent to leadership, granting individuals leadership status through the assignment of prestige. Using social network analysis of prestigious leaders (defined by their inward relational ties) in advice and participation networks, I compare the level of leader prestige with team performance and the dissemination of information. I look at a strictly hierarchical social context, the Royal Navy, and discover that informal networks are important in getting things done as well identifying trusted sources of information. The power of informal networks is even clear in command and control situations, usually considered to rely completely on the rank structure. By using the evidence of two social network analysis projects, I create a multi-agent simulation to explore the consequences of informal networks. The simulations show that prestige-bias helps to channel information and allows command and control networks to disseminate information quicker than formal hierarchies. Furthermore, the more decentralised the prestige network, the more efficient it is for disseminating information. The consequences for traditional leadership and human behaviour are discussed

6. Family matters, but why? A theoretical framework for understanding variation in kin influences on reproduction. Sear Rebecca, Moya Cristina

Kin matter for reproductive outcomes in humans. From an evolutionary perspective this is not particularly surprising, given the potential inclusive fitness benefits that can be gained from cooperating with kin. However, in human populations, these kin influences are inconsistent across context and across different reproductive outcomes: we first present a review of the empirical literature showing that kin are often associated with fertility in human populations, but these associations are cross-culturally variable, and not always positive. This is likely because: (1) there are various mechanisms by which kin may exert their influence, and (2) socio-ecological conditions will moderate some or all of these effects, by changing the costs and benefits of kin cooperation. Here, we draw together several disparate literatures on how kin may influence reproductive outcomes in our own species, in order to provide a theoretical framework which sets out the various adaptive mechanisms which have been proposed to link kin influence with reproductive outcomes. These mechanisms are: 1) provision of direct help by kin, 2) buffering of extrinsic mortality risks by kin, 3) kin providing cultural information, 4) kin acting as a cue to environmental context. We then consider how socio-ecological context influences these mechanisms, focusing on: 1) resource competition, 2) philopatry and residence patterns, and 3) whether a society has undergone the demographic transition. Our aim is to introduce greater coherence into the literature on why family matters for reproductive outcomes, and suggest profitable avenues for future research in this area.

## 7. Does the menstrual cycle modulate how trustworthy a woman sounds? Klatt Wilhelm Konrad, Lobmaier Janek

**Objective:** Accumulating evidence suggests that the attractiveness of women's voices is affected by menstrual cycle. In the present study we aimed at investigating whether the menstrual cycle also affects the perceived trustworthiness of a speaker, and whether sentence content has an influence on the speakers and/or on the perceivers.

**Methods:** The voice of 20 female speakers was recorded once around ovulation and once in the luteal phase. We recorded sentences that suggested a mating context and neutral sentences. For each speaker, recordings from both cycle phases were paired. An independent sample of 60 participants were asked for each pair to choose the voice sample that sounded more trustworthy. Stimuli were also rated for attractiveness. Another independent 60 participants were given the same task but with low-pass filtered recordings (content incomprehensible).

**Results:** Women's voices were perceived as being more trustworthy around ovulation irrespective of sentence content, but only when speech was comprehensible. In the attractiveness rating, voices in the luteal phase were preferred both when speech was comprehensible and incomprehensible. This was only true for sentences with mating context, not for neutral sentences.

**Conclusions:** Perceivers seem to be affected by speech content. Voices that sound more attractive do not sound more trustworthy. Our findings conflict with earlier studies suggesting that ovulatory voices are perceived as more attractive.

## 8. Winter swimming: the social using of psycho-immunology capabilities. Dotsenko Eugene

Based on a series of studies, the report attempts to interpret the results both in terms of conceptual generalization and in terms of applied use.

**Methods.** Two groups of subjects were examined: "professionals" - participants (22 persons) of the marathon (101 km) to set the Guinness record – each participant had 16–27 swims in icy water during 24 hours; "amateurs" - (a) those who participate in winter swimming groups to meet their personal needs, without socially stated purpose - 21 persons; (b) 20 athletes who made their first swim and 20 students.

A number of parameters were measured: (a) physiological - blood pressure, heart rate, functional activity of specific immunity (IL-4, γ-INF); psychological – Lusher test, motivation and anxiety questionnaires. In the first group were taken 4 measurements, in the second – 2 (before and after swimming in the ice hole).

**Results.** Strategies have been identified by which the participants of the marathon stabilized themselves – different for participants with different experience of winter swimming (1 to 15 years). It has been shown that the dynamic of mental and physiological processes are similar to addicted persons: anticipation of an event – psychophysiological interpretation of thermoregulation effects ("rush") – living the achieved effects ("savoring") – social support in conversations with others (tea party). It was concluded that winter swimming is classified as coping with a broad spectrum of actions (depending on the needs and expectations of users).

## 9. How can you hurt if you can't feel? Emotional failures of the Dark Triad traits. Szabo Edit, Bereczkei Tamas

Emotional deficits are considered a fundamental aspect of the Dark Triad (i.e., narcissism, psychopathy, and Machiavellianism). However, the nature and extent of such deficiencies differ among the dark personalities. Here we aimed to investigate in more details how these traits are linked to individual differences in understanding, evaluating, and manipulating with emotions.

We applied a multidimensional measure of empathy (Interpersonal Reactivity Index; IRI) and trait emotional intelligence (Schutte Self-Report Inventory of EI; SSRI) in a sample of undergraduate students (N=143). Each Dark Triad trait showed a unique pattern of emotional deficits.

Narcissism was positively, whereas secondary psychopathy negatively, associated with emotional intelligence. In respect of empathy, Machiavellianism, narcissism, and secondary psychopathy all showed some associations with different facets of the construct but only primary psychopathy was linked to overall empathy deficits.

Those high on psychopathy appeared to be less sensitive for other's feelings that might have an adaptive function of facilitating the manipulation of others. In evolutionary terms not to respond emotionally can cause a benefit, because empathy would inhibit the successful exploitation of others. On the other hand, narcissistic individuals seem to use their understanding about the emotions of others to have their own ego-needs validated. The different emotional limitations might contribute to the successful deployment of different socially aversive strategies of these traits.

## 10. Reinventing the Wheel: Phylogenetic Analysis of Mythological Data Questions Established Dates for the Earliest Wheel Technologies. Foster Dugald, Tehrani Jamshid

**Objective :** To compare archaeological and mythological evidence for the earliest instances of wheeled vehicles.

**Methods :** Mapping mythological data onto calibrated phylolinguistic trees enables inference of the age of particular mythological units ("mythemes"). Using a large database of comparative mythology (Berezkin 2015), mythological data from over 50 cultural groups were traced over established linguistic trees (Bouckaert et al 2012, Chang et al 2015).

Maximum parsimony analysis was used to reconstruct the ancestral states of Indo-European mythologies for the mytheme 'Big Dipper as a Wagon', present in cultures in which the 'Big Dipper' constellation is designated the status of a wheeled vehicle.

**Results :** Current dating of the earliest archaeological evidence for wheeled vehicles, along with linguistic evidence, has been placed around 4000 BC, well into the Bronze Age (Anthony & Ringe 2015). Analyses of mythological data suggest that the 'Big Dipper as a Wagon' mytheme, and therefore wheeled technology, existed >2000 years prior to this.

**Conclusions :** The inferred existence of wheeled vehicles predating archaeological finds demonstrates the value of alternative forms of cultural data, such as corpora of mythology, in helping to uncover origins of cultural phenomena. The results suggest wheeled technology was available to human groups before the start of the Bronze Age, although no archaeological evidence for this has been found. The paucity of linguistic and archaeological data available for many ancient technologies encourages complimentary analyses of unexplored forms of data, which can provide novel insight into the evolution of culture.

## 11. Domestication of the human brain: linking cognitive evolution and disease. Benítez-Burraco Antonio

Domestication gives rise to similar derived traits in most (if not all) mammal species (the "domestication syndrome"). Among others, changes in the brain, cognition, and behaviour are commonly observed.

In this talk I will argue that self-domestication of the human species can help understand how language evolved in the species, but also how language becomes impaired in cognitive disease, because of the deep link between evolution and (abnormal) development, in the spirit of evo-devo.

On the evo side I will first consider the role of domestication in the creation of the cultural niche that favoured the emergence of complex languages through a cultural process. I will then argue that self-domestication of the human species may have been a by-product of the same changes that brought about our distinctive mode of cognition, including our ability to learn and use languages (aka *language-readiness*). Specifically, I will show that candidates for language-readiness are found among (and interact with) the genes causing the constellation of distinctive traits observed in domestic mammals.

On the devo side I will present evidence suggesting that some human-specific pathological conditions impacting on our distinctive cognitive capacities and entailing problems with language can be linked to an abnormal presentation of the "domestication syndrome" in our species. I will focus on autism and schizophrenia, which are regarded as opposite (pathological) poles within the continuum of human cognition.

I will conclude by highlighting that this kind of evidence involving self-domestication provides a key link between modern cognition and modern behaviour.

## 12. Sons may be bad for mother's health. New evidence for costs of reproduction in women. Galbarczyk Andrzej, Klimek Magdalena, Nenko Ilona, Jasienska Grazyna

**Objective** High investment in reproductive processes (i.e., pregnancy, lactation and childcare) at the expense of other functions (i.e., somatic maintenance or immune defense) may result in substantially poorer maternal health. Health status at older age can be reliably assessed by self-rated health, which is a strong predictor of mortality.

**Methods** Data were collected by structured questionnaires among 425 women aged 45-92 from Polish rural population. Self-rated health was assessed by the standard question "How would you rate your health in the last 12 months?". For the analyses, responses were dichotomised into two categories, "poor health" and "good health".

**Results** Number of sons, but not daughters, was significantly associated with higher risk of poor self-rated health, adjusted for relevant socio-demographic characteristics. Each additional son increased the odds of poor self-rated health by 27% (OR=1.27; 95%CI 1.06-1.52). Maternal self-rated health was not related to the total number of children born (OR=1.09; 95%CI 0.96-1.22).

**Conclusions** We have shown that having sons and daughters may differently influence maternal health in later life. Sons are more energetically and immunologically demanding for the maternal organism, therefore it is not surprising that sons have more negative influence on mothers' health in older age than daughters. While investigating costs of reproduction sex of the child should to be taken into account.

## 13. A plea for a more stringent use of "mismatch". Stulp Gert, Barrett Louise

The western world is very different from those environments in which our species has roamed around for most of the time. Biology 101 tells us that with rapidly changing environments, (genetic) adaptation may fall behind rendering animals maladapted or "mismatched" to their environments. Some forms of human behaviour in the industrialised world might be similarly "mismatched", and this idea is gaining in popularity in the medical and psychological sciences.

In this talk, we try to argue the following points: 1) although the idea of "mismatch" provides a valuable perspective, it is often rather uncritically used; 2) the predictive ability of this perspective is often limited; even in rather clear cases such as obesity; 3) supposed cases of mismatch are often not backed up by appropriate empirical data; 4) this perspective is more valuable for the peculiarities of our body than of our mind.

We conclude that the "mismatch" perspective is valuable in understanding (some) contemporary human behaviour, but that its use should be more stringent. Instances of surprising human behaviour shouldn't uncritically be linked to mismatch. We further argue that maladaptive behaviour in contemporary populations is not so much a consequence of a "stone-age mind", but rather of a mind containing fundamentally novel ideas.

## 14. Strength is not related to men's relative facial width: Cross-cultural evidence. Trebicky Vít, Klusackova Tereza, Fialov Jitka, Kleisner Karel, Roberts S. Craig, Havlíček Jan

Previous investigations showed relationship between relative facial width (fWHR) and certain behavioural measures of intra-sexual competition such as aggressiveness, formidability or number of penalties in ice hockey and soccer players. However, due to the complex nature of these measures it is not clear which of their components primarily affect the observed relationship. One of such characteristics might be physical strength. Here, we focus on a relation between physical strength and fWHR in European and African samples.

The samples consisted of 52 men (mean age = 21.79ys, SD = 2.83) from Stirling, UK and 47 men (mean age = 23.55ys; SD = 5.82) from Babanki, Cameroon. The handgrip strength was used as a proxy to overall muscle performance and fWHR was measured from facial images. We also recorded the participants' age, body height and weight.

We found significant difference in fWHR between our samples, with Cameroonian having relatively wider faces. However, no significant correlation was found between fWHR and handgrip strength in any of the samples, even when controlled for confounding variables such as age, body height and weight.

Results from our cross-cultural comparison show that other components rather than physical strength are responsible for previously observed association between fWHR and intra-sexual competition-related behavioural characteristics in men.

## 15. The role of sociosexuality and trust in singles' online dating behavior. Hallam Lara, De Backer Charlotte, Walrave Michel

Humans evolved a complex menu of mating strategies including long-term committed romance and brief sexual encounters. Knowing that desire for brief sexual encounters corresponds with risk behaviour and that online dating platforms are perceived as risk-prone environments, we predict that singles desiring short-term encounters are more likely to date online. We further test whether different mating strategies transfer into different online dating trust levels.

An online survey ( $N = 121$  singles) with the revised Sociosexual Orientation Inventory (SOI-R) and a self-designed scale measuring trust in online dating safety, information sincerity, and platform efficacy was used. A yes/no question recorded participants' online dating experience (ODE). Results showed a main effect of sociosexual behaviour ( $z = 2.73, p < .01$ ) on the respondents' ODE, but no main effect of gender ( $z = .09, p = .93$ ), desire ( $z = .21, p = .99$ ), or attitude ( $z = .27, p = .78$ ). Yet an interaction effect showed that when predicting ODE, only the effect of sociosexual desire differed for men and women ( $z = 2.19, p < .05$ ).

Controlling for sex, results showed no significant relationship of sociosexual behaviour or desire on trust in online dating safety, information sincerity, and efficacy. Sociosexual attitudes had a main effect on online dating safety and efficacy. No sex differences were found.

In conclusion, women with brief sexual desires will date more online compared to men desiring short-term relationships. Men date more online if they seek long-term relationships. Results showed that individuals with short-term sociosexual attitudes had more trust in online dating platforms' safety and efficacy.

## 16. Intrafamily and intragenomic conflicts in human warfare. Micheletti Alberto, Ruxton Graeme, Gardner Andy

Recent years have seen an explosion of multidisciplinary interest in ancient human warfare. Theory has emphasised a key role for kin-selected cooperation, modulated by sex-specific demography, in explaining intergroup violence. However, conflicts of interest remain a relatively-underexplored factor in the evolutionary-ecological study of warfare, with little consideration given to which parties influence the decision to go to war and how their motivation may differ. We develop a mathematical model to investigate the interplay between sex-specific demography and human warfare, showing that: the ecology of warfare drives the evolution of sex-biased dispersal; conflicts of interest over warfare exist between parents and their offspring; sex-biased dispersal modulates intrafamily and intragenomic conflicts in relation to warfare; intragenomic conflict drives parent-of-origin-specific patterns of gene expression – i.e. "genomic imprinting" – in relation to warfare phenotypes; and an ecological perspective of conflicts at the levels of the gene, individual and social group yields novel predictions as to pathologies associated with mutations and epimutations at loci underpinning human violence.

## 17. Successful Joint-Action in professional Chinese rugby players: A buffer to the stresses of group exercise and a potential pathway to social bonding? Taylor Jacob

Exercise is a costly physiological stressor, but humans appear almost universally compelled to engage in it, often in group contexts. A plausible evolutionary explanation for the prevalence of group exercise may be the way in which it reliably activates psychophysiological mechanisms of pain, reward, and attention associated with social bonding. To date, however, very little is known about how proximate mechanisms of group exercise and social bonding vary by activity and culture. One theory suggests that successful coordination of joint-action can generate social bonding by reducing uncertainty contrived in group exercise scenarios like interactional team sport. In this study, 148 Chinese professional rugby players were surveyed before, during, and after a two-day national tournament. Results showed a significant relationship between perceived success in joint-action and social bonding (controlling for game outcome, and minutes played by each athlete,  $p < .001$ ). In addition, we found that levels of exertion and fatigue increased significantly over the course of the tournament, but only for less experienced (<3yrs playing experience) and not more experienced athletes (>>3yrs playing experience). Taken together, these results suggest that technical competence and the experience of the "team click" may play a role in buffering the stresses of exercise and generate social bonding. Controlled experimental research is required to further substantiate these predictions.

**18. Reconstructing demographic and cultural history of human populations from genetic and linguistic polymorphism data in central Asia.** Thouzeau Valentin, Mennecier Philippe, Verdu Paul, Austerlitz Frédéric

**Objective :** The main aim of our research is to develop methods for analyzing language diversity and genetic polymorphism data within a unique methodological framework, in order to infer the past history of separation, exchanges and admixture among human populations.

**Method :** For this purpose, we have developed a new computer program that simulates, simultaneously, the evolution of genetic and linguistic diversity in a set of populations for which both kinds of data are available. Simulations are then compared to real genetic and linguistic polymorphism data, using Approximate Bayesian Computations (ABC) to identify the most probable historical scenario underlying each type of data, and to infer the parameters of the corresponding model. So far, we have applied this approach to Central Asia, an area where Turkic-Mongol and Indo-Iranian speaking populations historically met.

**Results :** We show that in the history of Central Asia, genetic exchanges may highly differ from linguistic exchanges, which gives us new clues about particular events of admixture and asymmetrical histories of words and genes in this region.

**Conclusions :** Linguistic and genetic changes may highly differ even at larger geographical scales. So, parallel studies of genetic and linguistic histories allow us to deeply understand biological and cultural evolution processes, their dynamics, and their interactions.

**19. Familiarity with own population appearance influences face preferences.** Batres Carlota, Kannan Mallini, Perrett David

Previous studies have found that, in Malaysia and in El Salvador, individuals from rural areas prefer heavier women than individuals from urban areas. Several explanations have been proposed to explain these differences in weight preferences but no study has explored familiarity as a possible explanation. We therefore sought to investigate participants' face preferences while also examining the facial characteristics of the actual participants. Our results showed that, in both Malaysia and in El Salvador, participants from rural areas preferred heavier-looking female faces than participants from urban areas. Additionally, we found that the female faces from the rural areas were rated as looking heavier than the female faces from the urban areas. Our findings are consistent with the hypothesis that familiarity may be contributing to the differences found in face preferences between rural and urban areas given that people from rural and urban areas are exposed to different faces.

**20. Emotions and their perceptions in bonobos.** Van Berlo Evy, Kret Mariska, Bionda Thomas

Endemic to the Congo basin, bonobos have developed unique matriarchal social systems. In contrast to the more aggressive chimpanzees, bonobos preserve peace through female alliances and grooming and sex. Although the species has gained more attention in the last decade, there is still much to learn about this highly endangered ape. We aimed to improve our understanding of the emotional lives of bonobos by testing them on an experimental psychological paradigm that is often used in humans; the dot-probe task. We showed that the attention of bonobos is drawn more to protective and affiliative emotional scenes than to neutral stimuli, and especially to scenes depicting grooming and sex, but not as strongly to negative scenes depicting stress or aggression. This contrasts with what we know from humans, who often show an attentional bias toward negative scenes. The results suggested that protective and affiliative behaviors are pivotal in bonobo society and therefore attract immediate attention. In a follow-up study, we delve deeper into the effects found in bonobos and investigate whether an attentional bias for emotional scenes is moderated by group membership (i.e. individuals depicted on the stimuli are either familiar or unfamiliar conspecifics). In humans, attentional biases can be affected by group membership, for instance when stimuli depict other-race or other-sex, or so-called out-groups. Results indicate that the attentional bias for emotional scenes in bonobos is restricted to stimuli depicting unfamiliar individuals. This finding supports findings that bonobos are highly xenophilic apes.

**21. On the Plasticity of Human Mating Strategies: Long- and Short-Term Mating Preferences Change in Response to Evolutionarily Relevant Variables.** Thomas Andrew, Stewart-Williams Steve

**Objective** Several lines of evidence suggest that some of the within-sex variance in mating behaviour stems from an evolved tendency to increase or decrease long- and short-term mating inclinations in response to circumstances. The objective of this paper was to ascertain how rapidly such changes can occur, and what stimuli might initiate them – a previously unexplored area.

**Methods** In three experiments, participants indicated their preferred relationship type (long-term, short-term, or none) for a group of fifty other-sex individuals, both before and after exposure to one of three evolutionarily relevant cues. In Experiment 1, the cue was a set of videos related to babies and parental care; in Experiment 2, it was a slideshow of images associated with wealth; and in Experiment 3, it was a slideshow of images related to danger and threat.

**Results** Relative to a control group, relationship preferences changed in all three experiments in directions generally consistent with evolutionary psychological predictions. However, when the preference for one relationship type (e.g. long-term) increased this was not accompanied by a decrease in the other (e.g. short-term), suggesting that mating strategies may be activated independently. Sex similarities and differences were also found which were not predicted by the experimental hypotheses.

**Conclusions** These experiments represent the first explicit demonstration that brief evolutionarily relevant interventions can shift the relative strength of people's preferences for long-term and short-term relationships.

**22. The Effects of Mental Culture on the Reduction of Self-Interested Behavior.** Purzycki Benjamin

Despite many appeals to culture's impact on human morality and the expansion of human cooperation, behavioral studies rarely assess the relevant individual-level cognitive-cultural information that may motivate moral behavior. Drawing from a diverse sample of people from eight different societies, we use explicit, naturally elicited data of what it means to be "good" and "bad" to predict fair play in an economic experiment. We find that people are indeed more inclined to play by the rules when their mental models include "dishonesty" and "honesty" as salient components of morality. Even when participants and their local communities could stand to gain from systematic favoritism, task-relevant moral models predict fairer play toward anonymous, geographically distant people who are unlikely to ever reciprocate.

**23. Young Males with Injured Brains: a detrimental outcome of sexual competition?** Kocsor Ferenc, Tamas Viktoria, Gyuris Petra, Czeiter Endre, Kovacs Noemi, Doczi Tamas, Bóki Andras

**Objectives** Higher risk taking is particularly characteristic for males between 15–35 years, the age when intrasexual competition is the strongest. The evolutionary success of this fitness-maximizing strategy, however, does not mean that it does not have negative consequences: males have also a significantly higher tendency to die in accidents. We sought to test whether the age when the reproductive competition between males peaks corresponds to the age when the incidence of severe traumatic brain injuries (sTBI) is the highest.

**Methods** We analyzed the demographic data of consecutive patients with sTBI (N = 374) registered to a clinical database. We also aimed to assess the riskiness of the underlying behavior, therefore this has been rated by independent raters (N = 57).

**Results** Chi-square tests conducted on the demographic variables showed that males between 15–35 years acquire sTBI's from riskier behaviors, compared to male members of other age groups and females of any age. This was also confirmed by a Generalized Linear Mixed Model.

**Conclusions** The willingness of young males to engage in dangerous situations might be adaptive in terms of fitness maximization. However, for some individuals this intense sexual competition can be detrimental to health and survival. The correspondence of the demographic distribution of the reproductively most active population and those suffering sTBI's support the hypothesis that the higher external mortality rates of young males might be the direct consequence of an adaptive behavioral strategy.

**24. Friends for dating: sociosexuality and gender predict group success and bonding in real-life friendship groups. Rotkirch Anna, Van Duijn Max, Laakasuo Michael**

**Objective** Humans cluster into groups, of which the so-called "sympathy group" of around 15 individuals is crucial for peer sociality. However, friendship groups among non-kin remain surprisingly little studied in adults, partly due to lack of data. Evolutionary theory predicts significant gender differences in the composition and function of sympathy groups, usually related to known gender differences in aggressive behaviour, defence and foraging. Here, we investigate gender differences in real-life friendship group formation and success.

**Data and methods** We use a unique longitudinal study of friendship groups at a European fraternity. During their first year, students form single-sex groups, which often provide the basis for a lifelong association. Through consecutive surveys over three years, we use multilevel regressions to explore how psychological measures such as childhood background, life goals, personality, and sociosexuality relate to group formation and group success among men and women (N=26 groups, mean group size =15). Group success was measured as popularity within the fraternity structure, a goal for such groups, and as bonding, using the inclusion-of-other-in-self (IOS) scale.

**Results** Gender differences in group formation were especially prominent with regards to dating status and sociosexual orientation. Both male group formation and ensuing group popularity were predicted by dating status and socio-sexuality of the members.

**Conclusions** In our sample of young Westerners, male but not female group formation and success was strongly predicted by factors related to mating status and strategies. We suggest that mate attraction is an important and overlooked feature of human male sympathy groups.

**25. Birds of what feather do flock together? Assortative mating in different mate value factors in heterosexual and non-heterosexual samples. Csajbok Zsofia, Berkics Mihaly**

**Objective.** Homogamy can be observed along general mate value and/or separate factors. Evolutionary theories suggest a 'potentials-attract' approach, e.g. male status may be 'exchanged' for female attractiveness. Assortativity is also related to relationship satisfaction, although either in a linear or curvilinear way (the partner's high mate value may lead to fear of being left).

**Methods.** Theoretically traced models were investigated by measuring ideal standards, partner- and self-evaluations, and relationship satisfaction across gender and sexual orientation (total N=2686). To measure discrepancies, Manhattan distance was adopted as a new and meaningful variable in the multidimensional space of partner-evaluations.

**Results.** Data suggest that both males and females tend to 'pay' for a high value partner mostly with warmth. Satisfaction was linearly dependent on discrepancy between the ideal and the partner, mainly on discrepancy of general mate value, and to some degree on heterogamy.

**Conclusions.** Assortativity primarily seems to exist along perceived general mate value, which also predicts relationship satisfaction in a linear way, while specific factors also play a secondary role.

**26. Is sexual imprinting a mechanism for local adaptation? Richardson Thomas, Gilman Tucker**

**Objective:** Sexual imprinting occurs when individuals learn preferred phenotypes for mating by observing some other individual in their population. It is ubiquitous in birds and common in mammals, probably including humans. The template for sexual imprinting is often one of the choosy individual's parents. Theory suggests that sexual imprinting can evolve because it helps individuals avoid mates with deleterious alleles. If an individual survives to become a parent, it is likely to have good genes. That individual's offspring can obtain good genes for their own offspring by choosing mates with phenotypes similar to the parents'. However, because deleterious alleles are usually rare, selection for imprinting under this mechanism is weak. Moreover, if the same alleles are deleterious for all individuals, innate preferences should be more adaptive than imprinted preferences, so it is not clear why imprinting should be needed. Here, we asked whether spatially heterogeneous selection, where which alleles are deleterious varies across space, might better explain why sexual imprinting evolved.

**Methods:** We used deterministic dynamical systems models and stochastic individual-based simulations to study the evolution of sexual imprinting in systems with two patches under different selection regimes.

**Results:** Spatial heterogeneity can generate strong selection for parental imprinting. This is most true when males disperse more often than females. In spatially heterogeneous environments, learned mate preferences can be more adaptive than innate preferences. Populations with sexual imprinting are more adapted to local environments than those without imprinting.

**Conclusions:** Sexual imprinting may have evolved as a mechanism for local adaptation.

**27. The dynamics of cooperation when interactions change the rules of the game. Stern Caitlin, Roepstorff Andreas**

**Objective:** Models of cooperative behaviour often analyse iterated games to determine which strategies are favoured when individuals interact repeatedly. While individuals can respond to partners' past behaviour, the payoffs for a given behaviour are constant across interactions. In real-life interactions, past behaviour likely influences future payoffs. For example, people who have accumulated more resources may receive different payoffs from cooperating. Studying the influence of past interactions on current payoffs and behavioural options (the "rules of the game") means that we can more realistically evaluate the conditions under which cooperation is likely to emerge. Our goal is to determine when interactions that change the rules of the game promote versus inhibit cooperation.

**Methods:** We use an analytical mathematical modelling approach, building game theoretic models that allow us to study the conditions under which cooperative behaviours emerge.

**Results:** We study two sets of ways in which past interactions can influence future payoffs: changes in resource availability and changes in group composition. Depending upon the factor examined, cooperation becomes more likely, less likely, or is unchanged as compared to the same model with payoffs held constant over repeated interactions.

**Conclusions:** When past interactions can change the rules of the game, the conditions under which cooperation can emerge change in complex ways. Our results suggest that taking into account the influence of past interactions on future payoffs is crucial for making accurate predictions about the emergence of cooperation in real-world situations.

**28. General or targeted outgroup prejudice? The role of temporary and chronic pathogen avoidance motivation. Ji Tingting, Tybur Joshua, Mark Van Vugt**

From an evolutionary perspective, outgroup prejudice may be partially caused by behavioral immune system mechanisms, which are activated in response to outgroups' potential pathogen threats. Across three studies, we examined whether pathogen based intergroup prejudice is generalized to members of all outgroups indiscriminately (the generalized hypothesis) or specifically to outgroups that pose a known danger of pathogen transmission (the target-specific hypothesis). We tested the pathogen-based outgroup prejudice hypothesis using both experimental and individual differences approaches. Results showed that, at the individual differences level, stronger pathogen-avoidance motives are associated with greater prejudice against immigrants (Study 1 and 2, N's = 468 and 438). However, Study 3 (N= 445) suggests that this relationship was moderated by the origin of immigrants. The increase in outgroup prejudice associated with an individual's pathogen disgust sensitivity was especially pronounced against specific immigrant groups constituting high pathogen risk (Liberia during the Ebola crisis) but not to an immigrant group of unspecified origins. Experimental manipulations showed no effects of pathogen priming on outgroup prejudice across three studies, neither towards an origin-unspecified immigrant group nor a specific immigrant group. In general, results supported a target-specific perspective on pathogen based outgroup prejudice over a target-general perspective.

**29. Effects of embodied capital on delay discounting and the timing of life history strategies. Mell Hugo, André Jean-Baptiste, Geoffroy Félix, Baumard Nicolas**

Life History Theory predicts that individuals should be less future oriented in harsh environments where they are exposed to higher extrinsic mortality rates. Indeed, in such ecological regimes, the cumulative probability of dying before collecting the reward of an investment increases more quickly, which should favour faster allocation strategies (i.e. strategies that discount delayed rewards at higher rates). Yet differences in extrinsic mortality will generally have large impacts on optimal discount rates only when the decision window spreads across years or decades. When someone from a harsh background chooses 50\$ now over 100\$ in a month, it is unlikely to be because he estimates a particularly high probability for him or the experimenter to die within a month. Hence, it seems difficult to explain fast strategies when decision-making is impacted at short timescales. This research aims to bridge this gap by identifying factors that lead to steeper discount rates beyond extrinsic mortality. Using simple formal models, we show that depending on their levels of embodied capital, individuals suffer varying costs for delaying a reward, and that it should eventually determine the timing of their life history strategy.

**30. Shout of a champion: amplitude of the first harmonic frequency is associated with fighting success in Mixed Martial Arts fighters. Šebesta Pavel, Trebicky Vít, Fialova Jitka, Havlíček Jan**

Honest advertising of individual's formidability is supposed to prevent potentially costly physical confrontations. It can be hypothesised that several vocal characteristics could convey information about potential formidability. Previous research found association between acoustic correlates of lower pitch such as lower F0 of connected speech and higher fighting success in Mixed Martial Arts (MMA) fighters. It can be argued that shouting represents vocalisation type more ecologically relevant to de-escalate an already escalated conflict scenario and intimidate potential opponent. Therefore, our study focused on acoustical correlates of intimidation shouts produced by amateur MMA fighters in relation to their fighting success. 43 amateur MMA contestants (mean age = 24.2) attending a 2016 Amateur European MMA Championships took part in our study. We used ratio of past wins to overall matches as a marker of their fighting success. Three consecutive intimidating shouts were recorded under standardized conditions at championships site. Intensity, F0, harmonics frequencies (H1-H3) and amplitudes (A1-A3) were analysed using Praat. We did not find any relationship between shouts intensity, F0, or H1-H3 and fighting success. On the other hand, amplitude of first harmonic (A1) was negatively correlated with fighting success.

Our results showed that F0 or H1-H3 are not related to fighting success in our sample of MMA fighters. However, we suggest that A1 may be used in intimidation shouts instead. We provide evidence that certain vocal characteristics might be considered as markers of success in male competition.

**31. 3rd Party Kin Recognition. Fasolt Vanessa, Holzleitner Iris, Lee Anthony, O'shea Kieran, Jones Benedict, Debruine Lisa**

Kinship informs the allocation of pro-social and sexual behaviour. While cognitive cues, such as co-habitation, play an important role in assessing relatedness, phenotypic cues might also inform relatedness judgments. Research consistently shows that third parties can identify relatedness of individuals from their faces alone at levels somewhat above chance, but these studies differ in more nuanced findings, such as whether children resemble their mothers or fathers more. The methods used in these studies are inconsistent, however, as some studies used similarity ratings, some used binary kinship judgments, and others used a 3-alternative forced-choice task. Additionally, many studies have used non-laboratory photographs chosen by family members, which may contain biases. Here, we assess how experimental methodology influences third-party family resemblance detection using a large set of parent-child images taken under standardized laboratory conditions.

**32. Cooperation within and between groups in Southeast Alaska Natives. Barker Jessica, Veldhuis Djuke, Ferdinand Vanessa, Stern Caitlin**

**Objective** People are generally assumed to cooperate preferentially with members of small groups. However, opportunities for cooperation with members of other groups are often overlooked. It is unknown whether mechanisms that promote within-group cooperation also promote inter-group cooperation, and whether inter-group cooperation has the same functions as within-group cooperation. As people in many societies are simultaneously members of multiple groups, answering these questions is fundamental to our understanding of cooperation. In this study, we worked with Southeast Alaska Natives, using clan and community (kwaan) membership as a model system to understand the interplay between within-group and inter-group cooperation.

**Methods** We conducted surveys with 178 participants in Haines and Juneau, Alaska. All participants were self-identified Alaska Native, and the majority were Tlingit. The surveys included scales measuring clan and community identity, vignettes about inter-group interactions, and questions on participants' expectations and preferences for within-group and inter-group cooperation.

**Results** People felt equally strong group identity with clan and community members, but had different expectations for interactions when group membership was on the basis of clan versus community. For example, people had the highest expectations of interacting frequently with, being asked for help by, and having favors returned from members of different clans but the same community.

**Conclusions** Cooperation depends on expectations of future interactions and reciprocity, which are shaped by group identity. Our results provide the first indication that this hypothesis holds across group boundaries, and broadens our understanding of cooperation to a population typically excluded from behavioral studies.

**33. Does a common enemy unite rivals? Cooperation between subordinate out-groups in competition with superordinate out-groups. Kenny Adam**

The presence of a 'common enemy' is often thought to unite previously competing groups or rivals. This within-subject study aimed to test this 'common enemy hypothesis', making use of naturally occurring football rivalries at a time where both subordinate (club) and superordinate (national) identities were salient. In Italy, football is characterised by club-level (AC Milan-FC Inter) and national-level (Italy-Germany) rivalry. Therefore Italian AC Milan and FC Inter supporters played public good games online in homogenous and mixed groups, and against nothing, German supporters, other Italian supporters, and a non-social threshold.

The first expectation was that against nothing, individuals in mixed groups would make lower contributions than in homogenous groups; such general in-group bias was found. Second, if a common enemy is able to unify subordinate rivals, then contributions in mixed groups were expected to be similar to those in homogenous groups when individuals played against German supporters. Furthermore, if the common enemy hypothesis is exclusively correct, contributions were expected to remain relatively lower in mixed groups than in homogenous groups in the other two conditions. The results reveal similar contributions in mixed and homogenous groups when playing against German supporters, in support of the common enemy hypothesis. However, contributions were also similar when individuals played against other Italian supporters, whilst contributions remained relatively lower in mixed groups against a non-social threshold. Thus, this study suggests that the identity of a competitor is not important in unifying rivals; instead, the presence of another group is sufficient.

**34. Further explorations on the effect of attractiveness on attention, memory and time perception. Silva Andre, Macedo Antonio, Albuquerque Pedro, Arantes**

Recent studies by our team have shown that people attend more to attractive faces compared with unattractive faces; Regardless of previous allocation of attentional resources attractive faces produce higher number of recognition responses even when participants were not presented with those faces before and; Regardless of participants' gender, attractive males are overestimated compared with all other groups. But do attention, memory and time perception work independently or do they constitute an evolved unified system to enhance human reproductive success? To try answering this question we have replicated the procedures employed in the previous experiments. Participants were first presented with matrices of opposite-sex faces - half attractive, half unattractive - while their eye-movements were recorded. Then, participants completed a recognition task. Lastly, participants had to estimate the duration of either a neutral stimulus or a face in an oddball procedure. This face could be either attractive or unattractive, and either a new face or a previously seen one. Results show no effect of attractiveness on both attention and time perception, but attractive faces still produce higher number of recognition responses regardless of attention.

**35. The Good Side of Bad Personality Traits: Why are socially undesirable personality traits signalled by the face? Jaye McLaughlin, Robert Ward**

Previous research suggests that humans may have evolved the ability to recognise certain personality traits in faces. For traits that are generally seen as socially desirable (e.g. extraversion, agreeableness, and emotional stability), their adaptive and mate value is arguably clear; as is the value of signalling them. However, the ability to recognise a socially desirable trait (e.g. extraversion) implies an ability to recognise its socially undesirable counterpart (e.g. introversion). Considering this, how such signals in the face could have been sustained is less clear. It is theorised here that in certain contexts, some socially undesirable traits may in fact have value.

The ability to perceive theoretical advantages and disadvantages of traits in facial composites of people testing high or low in Extraversion, Agreeableness and Neuroticism was investigated. Participants (n=80) were asked to match positively and negatively framed characteristics for each trait to one of two facial composites (e.g. a composite of extraverts versus introverts). Following each trial, participants chose which of the two faces was most attractive, to determine whether the valence of characteristics could affect a trait's attractiveness.

The ability to perceive traits when the valence of the characteristic was incongruent with the trait's social desirability (e.g. positively phrased introversion) remained intact for most traits (but decreased slightly). This is consistent with the idea that socially undesirable traits have advantages in certain contexts. Attractiveness ratings for positively phrased traits increased compared to negatively phrased traits, suggesting that even socially undesirable traits hold mate value in some contexts.

**36. Mental health and costs of reproduction- poor mental health is associated with a larger number of children in both sexes. Lyons Minna, Warren Jasmine, Helle Samuli**

Fast life history strategy, manifested as a large number of offspring, is predicted to come with several reproductive costs. Previous research has suggested links between higher number of offspring and poorer health, reduced longevity and cognitive functioning, especially in women who bear the most direct costs of reproduction. Costs of reproduction with regards to mental health are less studied.

We analysed the costs of reproduction for mental health for 2129 men and 3207 women (n = 5336), using data from the British Psychiatric Morbidity Survey. When physical health, deprivation, age, and sex were controlled for, higher number of offspring had an association with poorer

mental health in both men and women. Our results indicate that the costs of a fast life history strategy are not only localised to physical health and early mortality, but have an effect on mental health as well, irrespective of the sex of the individual.

### 37. Whither the face? Impact of Menopause on Facial Attractiveness. Lobmaier Janek, Kuster Andrina

Objective: Accumulating evidence suggests an association between levels of reproductive hormones and a woman's attractiveness. For example, women with high estradiol levels are perceived as being more attractive than women with relatively low levels of estradiol. Moreover, women appear slightly more attractive around ovulation (when estradiol levels are high). A dramatic change in endogenous hormone levels occurs during menopause when production of estradiol and progesterone falls to a very low level. Given the association between reproductive hormones and attractiveness, we assessed whether menopause affects women's facial appearance.

Methods: We created pre- and post-menopausal prototypes by respectively averaging 8 standardised photographs of pre-menopausal and post-menopausal women. Each woman provided saliva samples from which we assessed estradiol, progesterone and testosterone levels. Twenty new faces were then shape transformed towards each prototype. The pre- and post-menopausal versions of the same identity were paired and 20 men (M=51.5 years) were asked to choose the more attractive face of each pair.

Results: Overall, the pre-menopausal version was chosen more often ( $p = .034$ , one-sided). Interestingly, we found a significant preference for pre-menopausal faces particularly for men who have partners who already went through menopause ( $p = .004$ , two-sided). Men with pre-menopausal partners showed no preference for either face ( $p = .971$ ).

Conclusions: We provide preliminary evidence that women may indeed become slightly less attractive after going through menopause, possibly due to reduced estradiol and progesterone production. However, this decrease in attractiveness is subtle and can only be detected by men who have experienced menopause in their own partners.

### 38. Synchrony and Social Bonding in Virtual Reality. Cohen Emma, Tarr Bronwyn

Experimental and ethnographic evidence has shown that synchronising movements in time with others can have significant positive effects on affiliative attitudes and cooperative behaviours. Virtual and online technologies hold enormous potential to increase social connection through embodied interaction, but the extent to which feelings of rapport and bonding can be elicited through synchronous movement in these environments has not yet been established. Furthermore, although many laboratory studies have shown differences in prosociality after synchronous vs. nonsynchronous activity, standard study designs and instructions to participants often entail potential confounds that obscure the effect of synchronous movement *per se*. To explore the generalizability of synchrony effects, and to eliminate confounds of suggestion, competence and shared intention, we used a Virtual Reality (VR) first-person immersive environment in which participants, represented as avatars, took part in a joint movement activity with two other avatars. The timing of the co-participant avatars' movements was covertly manipulated to achieve synchrony or non-synchrony with the focal participant, while maintaining matched movement form. Participants in the synchrony condition (N=38) reported significantly greater social closeness (liking, similarity, and connectedness) and fusion ('inclusion of other in self') to their avatar co-participants than those in the non-synchrony condition (N=38). These results suggest that synchrony is associated with positive social effects even in the absence of explicit instructions or shared intentions to synchronise and that effects are robust in a VR setting. Results may inform the development of VR interventions for social and psychological wellbeing.

### 39. The effects of social influence on the evolution of a binary decision preference and its association with continuously distributed opinions. Kendal Jeremy

Behaviour such as voting typically requires individuals to select from a discrete set of options but is based on opinions, attitudes and values that are continuously distributed. My research objective is to examine how social influence bound by homophily affects the evolution of binary decision preference and its association with continuously distributed opinions. Using computer simulation, I first consider the case where a binary decision preference is associated with a fixed range of continuously distributed opinions. I replicate the finding that evolved variation in continuously distributed opinions is inversely related to the degree of homophily, and show minimal conditions for the evolution of socially isolated extremism. I then highlight that if binary decision preference is no longer restricted to a fixed range of opinions, a small degree of drift in opinions can be associated with a large drift in decision preference frequencies. I describe two mechanisms that result in stable polymorphic decision preferences. The first is simply negative frequency dependent social influence while the second assumes that individuals adjust their opinion when required so that it is consistent with their adopted decision preference. In conclusion, the research highlights how the relative importance of social influence on opinions and decision preferences can have a crucial impact on the outcome of a collective binary decision.

### 40. Social and political environment affects gender preference. Juan Du

We show how sex-biases in parental investment in a Tibetan pastoralists society, has changed in relation to recent changes in the control of resources, that have resulted from changes in Chinese government policy. We examine four demographic measures which we believe are closely related to the sex-biases in parental investment: infant mortality, the type of feeding offspring, the marital status of the parents and the interbirth intervals. We interpret the demographic data to illustrate how people respond to the changing of social and political system with changes in the sex-biases of parental investment. Our results show that female-biased parental investment started to predominate since the earlier 90s, when both sexes could own land or livestock, but more recently, since 2000, biases are being muted in this pastoralist society as the system moves away from herding towards children's education. We argue that sex-biased parental investment are based on the potential economic contribution and inheritance patterns that are changing in response to policy changes which have altered the political, social and ecological environment at various times in recent history.

### 41. Mental imagery as a proximate explanation of the better remembering of living things over nonliving things. Gelin Margaux, Bonin Patrick, Bugaiska Aurélia

Recent studies suggest that human memory was shaped to remember fitness relevant information (Nairne, 2010). Animacy effects in memory, i.e., the finding that animates (living things capable of independent movement; e.g., *baby*) are remembered better than inanimates (e.g., *rope*), support this adaptive memory view. However, this ultimate explanation of animacy effects can be complemented by proximate explanations (Nairne & Pandeirada, 2016). One proximate explanation explored by Bonin, Gelin, Laroche, Méot and Bugaiska (2015) was mental imagery. They found that using interactive imagery, i.e., imagining oneself in interaction with the concepts denoted by the words, to encode animate vs. inanimate words did not alter the recall rate of animates but increased the one of inanimates. In a converse manner, the aim of the present study was to investigate the impact of "freezing" mental images. Two groups of participants performed a surprise free-recall task after the two encoding conditions: In one condition they created static mental images from words, i.e., "freezing" condition; in another (control) condition, they categorized words either as animate or inanimate. The animacy advantage was found only in the control condition. Furthermore, in line with Bonin et al. (2015), static imagery did not impair the recall of animates but increased the recall of inanimates. Since animates did not benefit from the "freezing imagery encoding procedure", we submit that the processing of animate items triggers spontaneously a mental imagery strategy.

### 42. Risk and the Sexual Division of Labor: Women's Selling Among the Shodagor of Bangladesh.

#### Starkweather Kathrine

The Shodagor of Bangladesh are a semi-nomadic group who live on small wooden boats and are culturally distinct from village Bangladeshis. Men's primary occupation is fishing - an occupation that produces low-variance returns - and women's primary occupation is selling and trading household goods door-to-door. Contrary to cross-cultural trends, women take on greater risk (financial, physical, and reputational) than men in their occupation, but also have the potential to out-earn their husbands. This talk will examine these unusual gender roles from an evolutionary perspective and discuss the ecological circumstances under which we might expect to see women pursue higher-risk economic strategies than men.

**43. Evolutionary Psychology of Sickness and Healing. Steinkopf Leander**

Considering the advancement and professionalization of today's healthcare, it is hard to imagine that care of the sick has been a part of human social life since Paleolithic times. Ancient care certainly did not involve modern means such as injections and x-rays, but was based on extensive support from the group, such as sharing food with sufferers, absolving them from duties, and simple medical procedures. Even though these early precursors were not as effective as modern healthcare, they could still make crucial contributions to the chance of survival and recovery. The long existence of the encounter between sufferer and helper and the fitness relevance of its outcome suggests that humans developed adaptations for problems incorporated in the sick role and the helper role, respectively. Such "sickness-healing adaptations" can offer evolutionary explanations for important phenomena in medical research. The placebo effect, social modulation of pain, and the impact of practitioner empathy and the patient-practitioner relationship on therapeutic outcomes can be regarded as adaptations for the sick role, while phenomena such as overmedication, prestige of medical professions, and racial discrimination in treatment can be attributed to selection pressures shaping the helper role. The talk integrates recent theoretical developments in evolutionary psychology and recent empirical research on heterogeneous topics such as pain empathy, disgust and the behavioral immune system, regulation of pain, quality of care, and the placebo effect. Thereby, the talk develops an evolutionary framework for studying healthcare interactions and may thus contribute to understanding and improvement of contemporary healthcare.

**44. Human cooperation: observations and experiments on games in the wild. Munro-Faure Amy, Bell Matt**

Contrary to much evolutionary theory, human populations are unusually cooperative. Laboratory studies of human cooperative behaviour have generally found high levels of pro-sociality. I used wild analogues of the pay-off structures commonly found in laboratory games to test whether these results are replicated when human behaviour is studied in naturalistic contexts. I carried out observational studies and experimentally manipulated the systems. For example, I replicated the structure of a laboratory dictator game by observing pedestrians interactions with homeless individuals. I then manipulated this system by, for example, changing the pay-offs by leaving money in the street that pedestrians could then use to make donations. I have found that people tend to behave less pro-socially in wild systems but that factors such as size of pay-off and degree of observation can have an effect on cooperative decision-making.

**45. Evaluation of accents can be used to demonstrate social transmission biases. Samarasinghe Alarna, Berl Richard, Gavin Michael, Jordan Fiona**

Accents convey information about people, signalling group identity and prestige. This study investigates variance in accent prestige and other attitudinal traits in order to demonstrate how accents can be used as a vector for social transmission biases. A survey was distributed online to 296 participants in the UK/Ireland and USA. Participants listened to 10 recordings of a standardised passage read by middle-aged white male speakers with different regional accents (8 from the participants' country of residence and 2 from the alternative), and rated the speakers based on a variety of traits. We find that traits cluster along two dimensions: prestige and friendliness. Non-location specific accents such as Received Pronunciation and General American are perceived as more prestigious than regional accents in both locations. This shared perception of accent prestige suggests that we can use non-location specific accents as an indicator of prestige in transmission studies.

**46. A drunk mind speaks a sober heart: Alcohol does not influence the selection of short-term partners with dark triad traits. Williams Charlotte, Lyons Minna, Christiansen Paul, Ingleby Beth, O'hagan Lauren, Dorozkinaite Diana**

Previous research has found that women dislike male faces high on the Dark Triad traits (i.e., Narcissism, Machiavellianism, and Psychopathy), which suggests that women are sensitive to the costs associated with mating with manipulative men. However, studies have also found that women who take sexual risks have an increased preference for narcissistic features in males. In the present study, we investigated how alcohol affects women's short-term mate choice.

In a two alternative forced-choice laboratory experiment, 68 women were randomly allocated to one of the following conditions: alcohol, placebo, or control. Following a drink administration, participants completed a risk-taking task (BART), and a computerised survey, choosing between high and low Dark Triad faces as short-term partners, as well as judging the faces for potential danger.

In all of the three conditions, participants chose the narcissistic face less than would be expected by chance alone. In the control and placebo, but not in the alcohol condition, narcissistic faces were perceived as more dangerous. In the placebo condition, increased risk-taking and decreased perception of danger were significant predictors of preference for narcissistic faces.

Our results suggest that although alcohol may not have a direct impact on mate choice, just thinking that one is under the influence of alcohol influences risk-taking and perceptions of danger, which could result in a riskier mate choice. We discuss the results with a reference to proximate mechanisms affecting women's choice for mates.

**47. Evolutionary Perspectives on Social Connectivity and Mental Distress. Evison Patrick, Lyons Minna**

Humans are an intensively sociable species, and social ties play an important role in enhancing the evolutionary fitness of an individual. Lack of social connections can lead to mental distress, such as depression and anxiety. However, empathy might be a factor mitigating the negative effects of loneliness. Previous evolutionary psychology research has looked at depression, anxiety, empathy, and loneliness as isolated traits. However, there is little research investigating the relative contribution of loneliness and empathy to mental distress. This study aims to investigate these links further.

In an online study, participants ( $N = 257$ ) filled in the Hospital Anxiety and Depression Scale (HADS), Interpersonal Reactivity Index (IRI), and the UCLA Loneliness Scale. Regression analyses revealed a distinctive profile for both depression and anxiety. Loneliness was a strong, positive predictor for depression, whereas both loneliness and empathy were positive predictors for anxiety. Our results indicate that lack of social ties contributes to mental distress, and that higher empathy, together with loneliness, have an impact on increased anxiety. These findings are discussed from an evolutionary perspective.

**48. Mate Preference Trade-offs a la carte vs. table d'hôte: Examining sex differences using Conjoint Analysis. Benjamin Jaime, Moore Fionna**

When forced to make tradeoffs between desirable attributes in a potential mate, previous research suggests men are likely to tradeoff status and resources for physical attractiveness, whereas women are more likely to tradeoff physical attractiveness for status and resources. However, the magnitude of these sex differences along with the strength of preferences may be exaggerated due to methodologies. Examining trade-offs can quickly become an overly complicated task when attempting to see how different levels of an attribute affect mate desirability, particularly when there are more than two attributes in consideration. Conjoint analysis (CA) is a multivariate analysis typically used to examine how several attributes factor into an overall choice (Green & Srinivasan, 1978; Luce & Tukey, 1964). In mate-preferences research, CA is extremely underutilized. Mate-preference research typically uses a 'compositional' approach, in which predictions incorporate effects of independent variables on dependent variables. CA is a "decompositional model" where the independent variables are set at different levels for profile creation, based on the idea that a person values an object as a whole, by combining the value of each component. In essence, rather than participants providing importance ratings for each attribute, the importance ratings are derived from their choices. The present study makes use CA as well as previously established methods of trade-off analysis (based on Edlund & Sagarin, 2010; Li, et al., 2002; Kendrick et al., 1990) to examine sex differences in trade-offs. Results are discussed with regard to evolutionary and sociobiological theories.

**49. Deception undermines the stability of cooperation in games of indirect reciprocity. Szamad Szabolcs**

Objective: Indirect reciprocity is often claimed as one of the key mechanisms of human cooperation. It works only if there is a reputational score keeping, and each individual is informed with high probability which other individuals were good or bad in the previous round. Gossip is often proposed as a mechanism that can maintain such coherence of reputations in the face of errors of transmission. However, the possibility of deceptive communication, where the signalers aim to misinform the receiver cannot be excluded.

Methods: Here we study the evolutionary stability of indirect reciprocity by means of individual based simulations in populations where individuals can be dishonest during gossip.

Results: When deceptive strategies are allowed in the population it will cause the collapse of the coherence of reputations and thus in turn it results the collapse of cooperation.

Conclusions: Our results question the leading role of indirect reciprocity in the evolution of large-scale human cooperation. Indirect reciprocity can be only proposed plausibly as a mechanism of human cooperation if additional mechanisms are specified that can maintain the honesty of gossip.

**50. Brazil's Football Soldiers. Newson Martha, Bortolini Tiago, Silva Silvio Ricardo da, Aquino Jefferson Nicássio Queiroga de, Buhrmester Michael, Whitehouse Harvey**

Football-related violence - hooliganism – is a global problem. Previous work suggests that hooliganism arises from social maladjustment. We instead propose that hooliganism is typically motivated by a parochial form of *prosociality*, common also in armed groups. In a survey of football fans in Brazil ( $N = 465$ ), we found that fan violence was fostered by intense social cohesion to fellow fans and membership in super fan groups that perceive chronic outgroup threats. In contrast, maladjustment was unrelated to indices of past acts of football-related violence or endorsement of future violence. These findings have far reaching implications for the prevention and containment of football-related violence around the world.

## Poster session 2 (Friday, April 7<sup>th</sup>)

### 1. Influences of clan and community identity on cooperative behaviour in Southeast Alaska Natives.

Veldhuis Djuke, Barker Jessica, Stern Caitlin, Ferdinand Vanessa

**Objective** Cooperation remains an evolutionary puzzle. Combining approaches from ethnography and behavioral ecology we investigate how perceptions of identity at clan and community levels impact group cooperation. The aim is to advance our knowledge of inter-group cooperation and specifically how people's perception of identity and belonging influence decision making in cooperative interactions. Human beings are adapted to group living and evolved mechanisms that favour local (in-group) cooperation at the expense of other (out-)groups. Although game theory models have been tested for decades, relatively less attention is focused on the influence of cultural dynamics which is something we address in this study.

**Methods** We carried out surveys and ethnographic interviews with 171 and 56 participants respectively in Haines and Juneau, Alaska. All participants were self-identified Alaska Native, and the majority were Tlingit. The surveys included open-ended interviews and questions, scales measuring clan and community identity and questions on participants' expectations and preferences for cooperating with different members across their communities.

**Results** Ethnographic interviews identified strong impacts of historical trauma (incl. enforced cultural and linguistic assimilation). A ripple effect of this trauma is seen across generations and becomes a 'badge' that arguably shapes the identity of young Alaska natives as strongly as historical kinship ties. People identify strongly with clan and community members but differ markedly in their expectations of what support and assistance they can or should be able to expect from their clan or community.

### 2. The Price of Attractiveness: Sex Differences in Mate Attribute Trade-off Equivalencies. Benjamin Jaime, Moore Fhionna

During mate selection, a trade-off is often faced between a mate's physical attractiveness and their status & resource attributes. Previous research has suggested that, due to minimal parental investment, men will prioritize physical attractiveness whereas women will prioritize mate's status & resources. There is conflicting evidence over the influence a woman's own status & resources has on her mate preference trade-off. There is also little research that examines the degree to which women's status & resources play a role in men's mate preference trade-off. The present study examines the equivalency values (that is, how much the level of one attribute can increase or decrease for a change in the level of another) between attractiveness and status & resources during a trade-off, by having men and women rate the desirability of the members of the opposite. Participants were presented with photos that ranged in attractiveness and were paired with various salary levels. Analysis examined how various measures of status & resources influenced participants' trade-offs. Results indicated that men and women's do not differ in the amount of income they are willing to gain (or lose) at the cost of a mate's level of physical attractiveness, nor does status variables predict the size of the trade-off. The lack of sex difference and that there was no effect of status may indicate a 'universal value' for physical attractiveness; however, this does not indicate a 'universal' preference. Evolutionary and sociobiological theories are further applied to discuss the results.

### 3. The cross-cultural development of beliefs that cultural group identities are stable. Moya Cristina

**Objective:** In some societies people expect children to acquire the cultural group identities of their birth parents, even in their absence. This genetic-like expectation of identity inheritance is puzzling given that cultural competence is acquired through socialization, and most neighboring cultural group boundaries do not map on strongly to genetic structure. In this paper we try to understand the development of, and spatial variation in, these expectations that identities are intergenerationally inherited.

**Methods:** By meta-analysing switched-at-birth vignette studies run with children and adults across several sites, we examine the cross-cultural development of notions of identity inheritance, and compare it to the development of species identity reasoning. We also test whether people are more likely to reason as if identities are genetically inherited when social boundaries are marked by phenotypic, intentional marking, linguistic, or status differences.

**Results:** We find stronger evidence of early developing beliefs that species identities are fixed at birth than that social identities are fixed at birth. Furthermore, species identity beliefs homogenize through development, whereas social identity beliefs diversify. Finally, all the above-mentioned features of cultural group boundaries increase, to varying degrees, beliefs that those identities are fixed at birth.

**Conclusions:** We find stronger evidence that reasoning about species identities as fixed at birth develops early and cross-culturally, than we do for cultural group identities. Diverse inheritance notions regarding social group identities develop, reflecting various affordances of the social group boundaries such as status and linguistic differences between them.

### 4. Father absence but not fosterage predicts food insecurity, relative poverty and poor child health in northern Tanzania. Anushe Hassan, Schaffnit Susan, Ngadaya Esther, Ngowi Bernard, Mfinanga Sayoki, James Susan, Borgerhoff Mulder Monique, Lawson David

The importance of fathers in ensuring child health in rural developing populations is questioned by anthropologists and population health scientists. Existing literature focuses on paternal death and child mortality. Few studies consider alternative forms of paternal absence and/or more subtle health outcomes. We determine the frequency and form of paternal absence, and its relationship to household food security, wealth and child health in a survey of 3136 children (<5yrs) from 56 Tanzanian villages. We contrast children residing with both parents to those that (i) have experienced paternal death, (ii) reside with their mother only and (iii) are fostered apart from both living parents. 77% of children resided with both their parents; 3.5% experienced paternal death; 13% resided with their mother only, primarily reflecting parental divorce/separation, extra-marital birth, or polygynous fathers residing with an alternative cowife. Paternal death and residing apart from one's living father was associated with lower food security and/or poverty and there is suggestive evidence that children in such scenarios achieve lower height-for-age. 6% of children were fostered and were comparable to children residing with both parents in terms of food security, wealth and anthropometric status. Our results highlight diversity in the form and consequences of paternal absence.

### 5. Social demography and the cultural evolution of art styles. Granito Carmen

Socio-demographic structure influences language form. In small isolated communities languages become more opaque (i.e. difficult for non-natives to learn), whereas in large high-contact communities languages become more transparent (i.e. easier for non-natives to learn). This might also be true for other communication systems. In graphical communication, opacity of representation increases over repeated interactions in pairs, where drawings change from iconic to symbolic and become harder for overseers to interpret; transparency of representation is instead retained over interactions in larger groups compared to smaller groups. However, it is still unknown whether cultural contact affects the transparency of graphical representations. Here we show that isolated communities develop opaque graphical representations, whereas representations in high-contact communities retain transparency. Laboratory micro-societies played a Pictionary-like drawing game in groups in two conditions: either only with members of their own group, or also with members of other groups. We found that drawings produced in isolation are more symbolic than drawings produced in contact groups; therefore, the former are harder to interpret for overseers than the latter. Results support the idea that cultural contact is a driver of communicative transparency regardless of the specific communication system. In particular, in graphical communication, the degree of contact is reflected in the drawing style. We anticipate this study to be a starting point for investigating representational styles in visual art in relation to the socio-demographic context. In a later study, we plan to test the same hypothesis on a dataset of artworks having the function of communicating a specific message.

## **6. A phylogenetic analysis of the evolution of descent and residence systems in Sino-Tibetan cultures. Ji Ting, Mace Ruth**

Here we examine the phylogenetics of kinship evolution among Sino-Tibetans. Methods: We use linguistic data to construct a phylogenetic tree of 96 Sino-Tibetan languages, and then use a variety of ethnographic sources to identify the kinship and residence of the cultures at the tips of the tree. Using Bayesian inference and phylogenetic comparative methods, we reconstruct the ancestral states of descent system in Sino-Tibetans and compare a number of different evolutionary pathways for the origin of the current distribution of residence. We also study the co-evolution between descent and residence in Sino-Tibetans. Results: We find that models allowing changes in either direction of male disperses or stays, and with some constraints on female's change between disperse and stay generally fit better than unidirectional models. The rare system of duolocality (neither sex disperses) evolves from matrilocality not patrilocality. In China it is widely believed that ancestral kinship systems were matrilineal, but we find no support for this view. Conclusions: These results suggest that the ancestral Sino-Tibetan society was not matrilineal, and the females' dispersal was constrained during the history, it was the change of males' dispersal patterns driving change in other social structure.

## **7. Homogamy, imprinting-like effect and consistency of mate choice. Turecek Petr, Sterbova Zuzana**

It was previously suggested that people prefer and choose romantic partners with self-similar (homogamy) and/or their parents-similar (imprinting-like effect) eye and hair colour. Effect of both mechanisms might differ to some degree according to mating context (i.e. long-term and short-term mating). However, are people even consistent in their mate choice concerning the hair and eye colour?

In total, 531 heterosexual participants were asked to indicate the eye and hair colour of themselves, their opposite-sex parent, and their all long-term and short-term partners. For each individual the consistency index (CI - defined as arithmetic mean of possible similar-1 and dissimilar-0 pairs of partners) was calculated for both mating contexts, hair and eye colour separately. The averaged CI was subsequently compared with the distribution of expected averaged CIs (yielded by permutation test) where the partners were assigned randomly (10 000 permutations, males and females permuted separately).

The results showed that people are more consistent in their mate choice concerning the eye and hair colour than expected by random pairing (observed CI was higher than 99.5% of random CIs in both mating contexts). People showed tendencies to choose self-similar and parent-similar partners in eye colour but not hair colour in both mating contexts. However, when we control for possible confluence of self-reported and parental eye-colour, the imprinting-like effect seems to prevail over homogamy.

## **8. Income, Economic Inequality and Religiosity in the USA. Ford Kathryn, Price Michael**

**Objective** Previous research has found that there is a strong positive cross-cultural correlation between economic inequality and religiosity (Gill & Lundsgaarde 2004; Scheve & Stasavage 2006). Many researchers have assumed that the correlation between economic inequality and religiosity is driven by people of lower SES turning to religion in order to cope with the higher levels of stress faced by people of low SES. However, Solt et. al. (2010) examined more closely the relationship between SES and religiosity and found that in societies with greater economic inequality, all members of society become more religious and that the increase in religiosity is especially strong among people of high SES (Solt et. al. 2010). This research aimed to investigate the link between income, state level economic inequality and religiosity.

**Methods** Using publicly available data we calculated the correlation coefficient between income and religious engagement for individuals in different states in the USA. We then plotted the correlation coefficient against state levels of economic inequality.

**Results** Increases in income reduce the levels of religiosity, this effect seems to be stronger in states with higher levels of economic inequality. These findings did not reach statistical significance.

**Conclusions** Our findings do not support the suggestion put forward by Solt et. al (2010) that high income individuals become more religious in conditions of high economic inequality.

## **9. Comparing statistical analyses of the stereotype threat literature: implications for the development of behavioural research. Brand Charlotte, Ounsley James, Van Der Post Daniel, Morgan Thomas**

The stereotype threat literature has become one of the latest in behavioural research to be accused of publication bias; two meta-analyses in 2016 alone suggested a lack of reliability in the effect. By simulating datasets based on this literature, we examine how using different methods of statistical analysis could affect the development of a field of research. We were interested in how certain one can be that a reported effect is present or absent in a population, given a certain number of positive and negative results, as is currently the case in the stereotype threat literature. We simulated multiple datasets to represent typical stereotype priming studies, whilst varying the size and variance about the true effect in the simulated population. We simulated 500 datasets in total and analysed them with commonly used frequentist methods, as well as a more novel form of Bayesian analysis. We employed informative priors that were based on parameter estimates of each dataset in the sequence (henceforth "posterior passing"). We compared four different analysis methods: a frequentist analysis of variance (ANOVA), a frequentist generalised linear mixed model (GLMM), a Bayesian GLMM using markov chain Monte Carlo estimation (MCMC), and a Bayesian GLMM with posterior passing. We found that using posterior passing allowed the true effect in the population to be found with higher certainty and accuracy than all other analysis types. We conclude that using informative priors could help researchers to be more certain about the presence and size of an effect in a population.

## **10. Ecological predictors of female sexual suppression. Muggleton Naomi**

Across human ecologies, female sexuality is suppressed by gendered double standards, such as "slut-shaming", imbalanced adultery laws and "honour killings". The question of what motivates societies to harshly punish promiscuous females, however, has been contested. Some researchers have argued that men suppress female sexuality, as a means of promoting paternity certainty. Alternative accounts argue that men have little incentive to stifle women's sexual desire, particularly when they are the object of such desire. Instead, women seek to limit sexual supply through punishing promiscuous behaviour, to induce men into paying a higher price for access (e.g., male-offered protection, security, commitment). This study addresses this gap by investigating the environmental cues which maintain cultural norms of punishing promiscuous women.

In a collection of four online studies, participants are matched with a female opponent (Promiscuous, Chaste) and engage in an Ultimatum Game. We predict that female participants will punish promiscuous women more harshly than male participants (Hypothesis 1). Among female participants, the severity of punishment should be greatest when punishers' educational attainment, economic independence and socioeconomic status are low (Hypothesis 2). At a regional level, women from egalitarian regions will punish more harshly than those from egalitarian regions (Hypothesis 3). In regions with a low sex ratio (i.e., increased difficulty in securing a male partner), punishment from female participants should be more severe (Hypothesis 4).

This project endeavours to reveal the ecological pressures which promote sexual suppression, ultimately contributing to the debate of how best to control harmful cultural practices.

## **11. Gendered products confer asymmetric benefits to the mate value of male and female consumers.**

**Borau Sylvie, Bonnefon Jean-François**

Gendered marketing is a pervasive and growing trend, in spite of the public controversies and ethical debates that it constantly generates. In the context of these controversies, we ask the following question: which benefits can men and women derive from owning gender-typical variants of common consumer goods? We propose that gender-typical products can act as tertiary sexual characteristics, broadcasting a cultural equivalent to the signals issued by biological, secondary sexual characteristics. Based on evidence showing that female secondary sexual characteristics increase attractiveness and desirability, more than male secondary sexual characteristics do, we predict that feminine (but not masculine) product variants increase the desirability of their owners.

We investigated the inferences that people made about the attractiveness and desirability of owners of gender-typical products, and whether these inferences translate in a dating preference for owners of gender-typical products. We find that women who own gender-typical products are thought of as more attractive, sexier, and more popular with men, and that men prefer to date women who own gender-typical products. Men who own gender-typical products, in contrast, do not enjoy any comparable benefits. This research provides the first empirical evidence that common everyday products (i.e., non conspicuous, non cosmetic) can increase consumers' mate value, and that their asymmetrical effect is consistent with the evolutionary function of secondary sexual characteristics.

**12. Environmental and cultural influences on the preferences for basic tastes.** Sorokowska Agnieszka, Pellegrino Robert, Marczak Michalina, Niemczyk Agnieszka, Huanca Tomas, Sorokowski Piotr, Anna Oleszkiewicz

Biological significance of food components suggests that preferences for basic tastes should be similar across cultures. On the other hand, cultural factors play an important role in diet and can consequently influence individual perception of food. To date, few studies have compared basic tastes preferences among populations of diverse environmental and cultural conditions, and research rather did not involve traditional populations for whom the biological significance of different food components might be the most pronounced. We compared three populations, covering a broad difference in diet due to environmental and cultural conditions, market availability, dietary habits and food acquisition: 1) a modern society (Poles,  $n = 200$ ), 2) forager-horticulturalists from Amazon/Bolivia (Tsimane',  $n = 144$ ), and 3) hunter-gatherers from Tanzania (Hadza,  $n = 89$ ). The preferences for basic tastes were measured with sweet, sour, bitter, salty, and umami taste solutions. We found that Tsimane' and Polish participants liked the sweet taste significantly more than Hadza participants, Hadza liked salty taste more than the two remaining societies, and Polish people enjoyed the sour and bitter tastes least of the three participating groups. Interestingly, no cross-cultural differences were observed for umami taste. Importantly, Hadza showed a pattern to like basic tastes that are more common to their current diet than societies with access to different food sources. Therefore, this study shows the impact of diet and market availability on most basic tastes. Further, umami may be a universally liked taste in societies that are carnivorous in their diets.

**13. The structure of cooperation in reindeer herders' social networks.** Thomas Matthew, Bårdsen Bård-Jørgen, Naess Marius

Social network structure, and the positions of individuals within networks, influence cooperation and reproductive success in many human societies. Pastoralists, such as Saami reindeer herders in Norway's Arctic region, rely on networks of kin and non-kin not only within their herding groups but also across groups. However, little is known about how social networks are associated with herders' cooperation and productivity. Through analyzing reported and experimental cooperative behaviours, we show that cooperation was tightly focused within herding groups (known as 'siidas'), and especially directed towards closer relatives. Individuals with ties to well-connected herders owned more reindeer, and people named more often in cooperative networks received more gifts. Herders who acted as 'bridges' between clusters did not have greater wealth nor did they occupy formal leadership positions. An exploratory analysis suggests that social network position was not associated with a fitness proxy. These patterns suggest that the structure of social networks, rather than individuals' positions within networks, shapes cooperation in this population, whose members also reported strong norms of equity and reciprocity. Our results shed light on how herders might respond in the face of upheaval from land privatization and climate change.

**14. The relative importance of various attractiveness and dominance measures in sexual selection in human males.** Kordsmeyer Tobias, Penke Lars.

Recent evidence suggests that in sexual selection on human males, intrasexual competition plays a larger role than female choice. In a sample of men ( $N = 165$ ) we sought to provide further evidence on the effects of men's dominance and attractiveness on mating success, in order to elucidate their relative importance in human sexual selection. Objective measures of men's traits purportedly under sexual selection (height, vocal and facial masculinity, upper body size from 3D scans, physical strength, and baseline salivary testosterone) and observer perceptions of physical dominance and short-term attractiveness based on two video recordings (a self-presentation and a competitive interaction between two men) were assessed in association with mating success (SOI-R sociosexual behaviour). Results of this multi-method study revealed positive associations of upper body size and physical strength with rated physical dominance, and negative associations of voice pitch (F0) and upper body size with rated short-term attractiveness, as well as a positive effect of physical strength on attractiveness. Moreover, upper body size and rated physical dominance, but neither rated short-term attractiveness nor any objective measure associated with it, were linked to higher mating success. Rated physical dominance mediated the effect of upper body size on mating success. These findings thus suggest a higher importance of intrasexual competition than female choice in human male sexual selection.

**15. Science as an epidemiology of representations.** Blancke Stefaan, Heintz Christophe

Evolutionary accounts of science as proposed by Popper, Campbell and Hull assume a close analogy between the dynamics of science and biological evolution. According to these models, science proceeds by selection of the theories that best fit the world from a pool of randomly generated variants, and accumulating into increasingly complex and accurate accounts of the world. Such selectionist accounts include a useful description of the history of science as the evolution of the distribution of scientific ideas, practices and tools in the scientific community. However, these approaches do not provide an adequate description of the causal processes that distribute scientific items. In particular, they wrongly assume that scientific concepts propagate and stabilize through replication. Instead, building on an epidemiological framework, we propose that concepts spread via communication chains in which individuals reconstruct a new version of the concept. This process generates many transformations, yet some scientific concepts are stable within the scientific community. Cultural epidemiology assumes that such stability results from systematic reconstructions towards specific forms and contents. The production of scientific concepts is determined by various factors including the structures of our evolved cognitive make-up. We will demonstrate the impact of human cognition on science with two case studies: the history of infinitesimals and the non-Darwinian revolution.

**16. Implicit deed: human evolutionary perspective.** Dotsenko Eugeny, Pchelina Olga

**Objective** The research presented is aimed at the understanding of the implicit deeds role in a person's life. Under the (implicit) deeds we understand personal important choices between alternatives based on incompatible values.

**Methods** 68 persons 35-50 years of age highly educated were examined by using

- (a) repertory grid technique – the data obtained were processed by means of multidimensional scaling;
- (b) semantic differential method – the data being processed with a help of cluster and factor (exploratory) analysis.

**Results** Being received differently the data do not contradict but corroborate each other. The categorization of deeds is performed by people as "right – wrong" and "cognitive – emotional".

In the category of correct choices of both men and women are insight reading emotional cues irrational and postintentional deeds. If spoken about men and women there is a difference in objects location according to emotional and cognitive categories.

**Conclusions** Results of the present research reveal the limitations of the approach to the study of selection only as to the conscious consideration of motives, without taking into account the implicit factors and emotional cues. We offer for discussion an evolutionary perspective of the obtained results.

**17. Simultaneous Human Behaviour Research And Public Engagement in Science Centres.** Kendal Rachel, Kendal Jeremy, Mursic Zarja, Bailey-Ross Claire, Rudman Hannah, Lloyd Andy, Ross Beth

**Objective:** To explore how academics may exploit opportunities offered by Science Centres/Museums for researching human behaviour and, simultaneously, engage the public in their science.

**Methods:** Using participatory action research, interdisciplinary academics and Centre for Life (CfL) practitioners designed an 'Interactive Research Pod' (website: [creativescience@life.com](mailto:creativescience@life.com)). The pod is a live research exhibit, which records both visitors' interactions with a task using video, and their ethical consent via a touchscreen. We were interested in understanding social influences on creativity and so invited visitors to engage in a block-building exercise under one of three conditions: asocial learning, social learning or collaboration. Interviews ( $N=120$ ) at the pod, and control exhibits, were carried out to explore public engagement.

**Results:** The 5,500+ participants in 8 months demonstrated that sufficient data may be collected easily to counter issues of experimental control. There were differences between learning conditions in a number of creativity measures, and public enthusiasm for, and engagement, in this multipurpose exhibit/interactive research pod.

**Conclusions:** The interactive research pod enables academics to achieve multiple aims: (1) Publishable research of a diverse and large sample, in a real-life context but with some experimental control and little time investment; (2) Societal impact, engaging the public in scientific enquiry and in particular research findings (3) Contribute to the content, and scientific credibility, of Science Centres/Museums.

## 18. Animacy effects in episodic memory: Evidence for a stone-age memory. Bonin Patrick, Gelin Margaux, Bugaiska Aurélia

According to the adaptive view of memory (Nairne, 2010) animates (e.g., rabbit) are remembered better than inanimates (e.g., mountain) because animates are more important for fitness than inanimates. In effect, for ancestral hunter-gatherers immersed in a rich biotic environment, animals and human beings were important categories that had to be carefully attended to (e.g., many animals were predators). We investigated whether animacy effects in episodic memory are independent of encoding instructions. Two studies tested whether certain instructions drive people to attend to inanimate more than to animate things (or the reverse), and therefore lead to differential animacy effects. The findings showed that animacy effects on recall performance were observed in the grassland-survival scenario used by Nairne, Thompson, and Pandeirada (2007) or in non-survival scenarios of moving to a foreign land or planning a trip as a tour guide. The findings suggested that animacy effects are robust since they did not vary across different sets of encoding instructions. Following an evolutionary account of animacy effects, it is not enough just to remember animates better than inanimates; it is also important to remember the context (e.g., where and when animates were encountered). Likewise, we tested recollection of spatial information and temporal information associated with animate versus inanimate words. We found that the two types of contextual information were remembered better when they were related to animates than to inanimates. Overall, animacy effects in episodic memory provide strong evidence for the idea that we still have a stone-age memory.

## 19. Cumulative cultural evolution of films: The case of anachronies. Sobchuk Oleg, Tinitis Peeter, Shelya Artjom

The history of films can be understood in terms of cumulative cultural evolution: the artistic techniques used have arguably become increasingly complex throughout the 20th century. We study changes in the use of a storytelling technique called anachrony, i.e. a purposeful modification of the order of events in the story (e.g. through flashback sequences). Past research has shown anachronies to help trigger curiosity in the audience. We hypothesize that recent cultural evolution of films has led towards a greater reliance on this technique.

**Methods:** We collected a sample of 80 'mystery' films released in 1970-2009 (10 for each 5 years) that demonstrate high cultural impact (based on viewers' voting and activity scores in the Internet Movie Database). We marked the positions of the anachronies and the number of timelines present (i.e. substories happening in separate time periods) in each film.

**Results:** Anachronies became increasingly used in the period, with a greater part of the sample utilizing them and to a higher degree (Figure 1). More anachronies also allowed for greater narrative complexity by supporting more timelines. High anachrony films also distributed them more evenly throughout the film while low anachrony films often clustered them near the beginning and end (Figure 2).

**Conclusions:** We observe that films have become increasingly reliant on a technique with psychological appeal. The more even distribution within high anachrony films also suggests a transformation in its function towards a more generalized technique. We argue this to be a case of cumulative cultural evolution in films.

## 20. Relationship with parents during childhood predicts age of the first love but not the first sexual experience in heterosexual and non-heterosexual individuals. Sterbova Zuzana, Bartova Klara, Weiss Petr, Varella Valentova Jaroslava

According to life history theory (LHT) relationship with parents during childhood influences individual's sexual strategies in sexual maturity. It has been reported that individuals who grew up without father or reported poorer relationship with him, indicated higher tendencies for promiscuity, higher risk-taking behaviour, and earlier maturation. Yet, there is restricted evidence for non-heterosexual individuals. The main aim of this study was to test whether quality of relationship with opposite-sex parent during childhood predicts the first romantic and sexual experiences in heterosexual and non-heterosexual men and women. A representative sample of 1730 Czech participants between 18 and 84 years of age rated quality of relationship with their opposite-sex parent during childhood, age when they fell in love for the first time, age when they experienced the first romantic relationship longer than 6 months, masturbation, necking, petting, and coitus. To test for the effect of relationship quality with parents, sex, and sexual orientation on sexual strategies, we performed Univariate general linear model (GLM). The significant effect of the quality of relationship with parent was found only in the age of first fall in love ( $F=10.712$ ,  $p=.001$ ,  $np^2=.006$ ), with significant effect of sexual orientation ( $F=12.472$ ,  $p<.001$ ,  $np^2=.007$ ), but not sex. Respondents with better relationship with parents reported later age of their first love than respondents with poorer relationship with parents. Furthermore, non-heterosexual individuals fell in love later than heterosexuals. Our results partly supported LHT, however, only in specific domain of sexuality.

## 21. Low 2D:4D in men – better chance for high-quality mates? Kuna Berenika, Galbarczyk Andrzej

**Objective:** The low 2nd to 4th digit ratio (2D:4D) in men, which reflects higher exposure to testosterone during fetal development, may be associated with their higher reproductive success in adulthood. However, evidence for direct impact of prenatal sex steroids levels on male fertility are still insufficient. Here, we investigate if this phenomenon may be explained by being coupled with more attractive and more fertile women.

**Methods:** We compared waist-to-hip ratio, breast size and body type of 50 nulliparous women from two groups, depending on the 2D:4D (more masculine, more feminine) of their actual partner. Additionally, we re-ran analyses with 2D:4D as a continuous variable.

**Results:** Men with low 2D:4D were coupled with women with significantly lower waist-to-hip ratios ( $p<0.001$ ). They were also four times more often partnered with women who had both relatively narrow waists and large breasts. We found a positive correlation between 2D:4D in men and waist-to-hip ratio of their partners, however results were significant only for values obtained from right 2D:4D ( $p<0.001$ ).

**Conclusions:** Our findings suggest that levels of sex steroids during fetal development in males may have long-lasting impact on mating value in individuals. To our best knowledge, this is the first study to show relationships between intrauterine hormonal environment in men and anthropometric traits of their actual mates, related to both - perceived attractiveness and most beneficial hormonal profiles, crucial for further reproductive success.

## 22. A Bibliometric Analysis of Studies on Human Mate Preferences. Pollet Thomas

One of the most prominent research areas in the field of evolution and human behaviour is the study of mate preferences and mate choice. We performed a literature search and searched through the key journals in the biological and social sciences leading to 1,311 records, which were extracted from Web of Science (1990-2015). Using bibliometric analyses (bibliometrix in R), we examined the growth of the field, most cited journals, the top 20 cited papers in the field, etc. . In addition, we examined the co-author networks, co-citation networks, country collaborations, and keyword coupling. The key results show that there is evidence for a clear growth in the number of papers in this field (Annual growth rate >10%). With regards to authorship, we found that the majority of authors in our dataset are only listed on a single article. Conversely, the "top 10 authors" contribute to around a quarter of the articles. The co-author graph demonstrated a clear tight-knit cluster of researchers primarily focussing on facial attractiveness. While separate, this cluster also acts as a bridge between other research clusters. The co-citation graph indicated the centrality of Trivers (1972) and Buss (1989). Co-citation analyses also indicated a tight clustering between "psychology" focussed journals, and between more "behavioural ecology" focussed journals. The country-collaboration graph indicated that the Anglo-Saxon countries (U.S., England, Scotland, Canada) were the most collaborative. Results are discussed with reference to the state of the field and its potential future directions.

## 23. Sex differences in intergenerational transmission of economic status. Pink Katharina, Schaman Anna, Fieder Martin

Today wealth mostly is generated by income through work and to some degree by inheritance. Accordingly we aimed to quantify the effects of parental socioeconomic status (SES -- measured by parental income and education) on the next generations income, using data from the Wisconsin Longitudinal Study (10,317 Wisconsin high school graduates), separately for men and women (5,326 women and 4,991 men). Both parent's education and their pooled income were used to predict their children's income. We also controlled for the number of siblings and compared the magnitude of the above mentioned effects for sons and daughters. We found that parental SES contributes particularly strongly to their son's income and to a lesser degree to their daughters income. Contrary to the literature we found no effects of the number of siblings. From an evolutionary point of view this is of certain interest, as it is known that wealth enhances the reproductive success of men, accordingly the intergenerational transfer of SES to the sons may help to increase their reproductive success.

## 24. What explains the frequency of use in kinship terms across Indo-European languages? Racz Peter, Jordan Fiona

The type of kinship terminological system used by a society is heavily influenced by linguistic and cultural ancestry. At the same time, external pressures like social dynamics and cognitive biases also play a role in selecting for a kinship system (Levinson 2012, Kemp & Regier 2012). We know that frequency of use is an important functional pressure in determining the shape of language systems (Bybee 2006). No previous research has looked at the role of frequency of use in the emergence and organisation of kinship term systems. Here we take a first step in this direction with a corpus-based analysis of kin term use.

We collected token frequency data for kin terms in 20 European languages from curated national corpora and web corpora, from both the spoken and the written domain. We use a phylogenetic tree estimated via a set of core vocabulary cognates to control for cultural relatedness across the languages in our sample. After incorporating phylogenetic information in a regression model, we rely on residualisation to determine the amount of variation not accounted for by the phylogenetic signal.

The phylogenetic signal accounts for a considerable degree of variation in our sample, indicating that cultural relatedness is as important for kinship term frequency of use as it is for kinship typology. Clustering residual variation reveals interesting patterns that must be accounted for based on external, cultural or cognitive, pressures. The results are relevant for both the study of kinship and for the causes and patterns of cross-cultural variation.

## 25. Lying as a social strategy. Ding Haoran, Petra Kubernatova

Our study focuses on "social lies". In general, lying encompasses different sorts of communicative acts known by the speaker to be at odds with an actual state of affairs. However, in contrast with deceptive behaviour that serves to maximise an individual's (short-term) benefits, social lies intend to make us or others feel good by avoiding hurtful truths.

Primates form bonded social groups. The bigger such a group grows, the harder it is to keep up the social bonds within it. Arguably, this is no different for us humans [1]. We turn to different kinds of strategies to keep the interactions and connections within our social environment intact, thereby maintaining our social network as a whole.

Examples of such strategies used by humans are described in [1] and include such activities as storytelling and gossiping. We hypothesise that social lying is also one of these strategies.

In order to test this hypothesis we set up an online experiment in which we investigate the relation between social lies and metrics of social network size and formation. Within the study we measure the social group size of the respondent and ask scenario-based questions which we developed for our project. A pilot run of the research indicated promising tendencies involving time spent socialising and gender differences. A follow-up study is currently being conducted.

[1] Gamble, C., Gowlett, J., & Dunbar, R. I. (2014). *Thinking big: How the evolution of social life shaped the human mind*. London: Thames & Hudson.

## 26. Voluntary smiles increase femininity: A comparison of human ratings and computational shape analysis. Shingler Polly, Ward Robert

**Objective** People can make accurate social judgements based on passport-style photographs of neutral faces. From an adaptive perspective, we might ask why a signal sender would broadcast a socially undesirable trait through their appearance. We suggest that a voluntary smile might enable a signal sender to temporarily manipulate the signals they are sending to their own benefit.

**Methods** In this study, participants rated male and female faces, which were either smiling or holding a neutral expression, for attractiveness and sex typicality. Computational shape analysis was also performed on the faces to get objective information about them.

**Results** For the human judgements, we found that smiling was seen as more attractive for both male and female faces. However, smiling also made the faces look more feminine. Additionally, attractiveness and sex typicality were correlated for both men and women. We found that the computational ratings of sex typicality followed the same pattern as the human ratings in that smiling faces were given a more feminine score.

**Conclusions** We conclude that smiling makes women more attractive by making them appear more feminine, and that smiling makes men more attractive but due to factors other than a changing level of sexual dimorphism.

## 27. The Dark Triad and facial masculinity: females are not attracted to psychopaths. Kozma Luca, Trebicky Vít, Kocsor Ferenc

**Objective:** Previous research using self-reports has showed that Dark Triad (DT) traits seem to indicate a good short-term mating success in men. This would suggest that women show a preference for men high in DT. DT traits are said to convey similar qualities as masculine faces: manipulative, dominant, selfish. Our pilot study explores whether facial masculinity and DT traits are associated.

**Methods:** We asked 39 men to complete the Short Dark Triad (SD3) and took standardized photographs of each of them. With their consent, we presented the photos to 40 female students. Women were asked to rate how masculine and attractive the faces were, using a 7-point Likert scale. Finally, we created a masculinity index based on measured facial morphology.

**Results:** As expected, faces that were more masculine were rated as more attractive. We found a marginally significant negative correlation for psychopathy and other-perceived attractiveness, but no correlation for the other two subscales of the SD3. Additionally, in contrast to previous studies, there was a significant negative correlation between facial masculinity and self-reported psychopathy.

**Conclusions:** This study goes against Lyons et al.'s (2015) results – when judging individual faces instead of morphs, women do not perceive high psychopathy faces as more masculine. In fact, men who scored higher on the psychopathy subscale of the SD3 have less masculine faces. These findings highlight the need to re-evaluate the potential developmental connection between DT traits and facial testosterone markers.

## 28. Granny helps or hinders? Age and lineage differences in grandmother effects in historical Finland.

Chapman Simon, Lahdenperä Mirkka, Pettay Jenni, Lummaa Virpi

**Objectives** In both contemporary and historic populations, survival of grandchildren is affected by the presence of grandmothers. The exact effects, however, differ depending on whether the grandmother is paternal or maternal. Such differences could arise from both socio-cultural as well as age differences. Importantly, grandmother age is often not directly taken into account by studies investigating grandmother effects – as young grandmothers may still be raising their own offspring, and older grandmothers may be too frail to provide help, grandmother age could have a critical role in survival of grandchildren. We therefore investigated how grandmother age may affect survival of grandchildren in a historic population.

**Methods** Using time event survival analysis on a large, multigenerational dataset of pre-Industrial Finns (with known importance of grandmother effects) we examined the effects of maternal and paternal grandmothers. Additionally, we determined at what grandmother and grandchild ages these effects are realised.

**Results** Paternal grandmothers did not affect grandchild survival, whilst having a maternal grandmother was more beneficial than a paternal grandmother in the first two years of life, and better than no grandmother after two. When both grandmothers were alive, survival was as high as when only the maternal grandmother was living. From the age of five onwards, grandmother presence had little impact on child survival, whilst younger, reproductively-active, grandmothers had a negative effect on survival.

**Conclusions** Survival differences between grandchildren of maternal and paternal grandmothers were only present in early life. Grandmother age and reproductive status were important factors in grandchild survival.

## 29. Impact of different social learning mechanisms on the emergence of a Walrasian Equilibrium.

Carrignon Simon, Rubio-Campillo Xavier

**Objectives:** model and test how different social learning mechanisms allow or not a simple society to find an economic equilibrium.

**Methods:** We use a model already developed to study the co-evolution of culture and economy. In this model, groups of agents produce, consume and exchange goods and adapt their trading strategy by innovating, or by learning from someone else.

We explore this model using a variation of Approximate Bayesian Computation, that allows a fitting to idealized outcomes (FIO), to compute how likely different social learning processes lead to an ideal situation where all exchanges are made under the general equilibrium ("Walrasian equilibrium").

The likelihood of leading to this equilibrium is measured for three different learning mechanisms (neutral, success biased, and frequency-biased copy) under different sets of parameters (number of agents and goods, innovation and copy probabilities,...).

**Results:** We show that a neutral learning process cannot lead to any efficient equilibrium. In the other cases, an innovation process has to occur but at a relatively low rate to avoid harming the stability of the equilibrium. In most of the situations, the success biased mechanism is the most likely to lead to the expected equilibrium.

**Conclusion:** This study demonstrates that in a wide range of circumstances, a simple social learning process where people tends to copy the more successful, coupled with a low innovation rate, are enough to lead a society toward an efficient economic equilibrium.

## 30. Tandem androgenic and psychological shifts in male reproductive effort following a manipulated 'win' or 'loss' in a sporting competition. Longman D., Surbey M.K., Stock J.T., Wells J.C.K

Male-male competition is involved in inter and intrasexual selection, with both endocrine and psychological factors presumably contributing to reproductive success in human males. We examined relationships among men's naturally occurring testosterone, their self-perceived mate value (SPMV), self-esteem, sociosexuality, and expected likelihood of approaching attractive women versus situations leading to child involvement. We then monitored changes in these measures in male rowers ( $N=38$ ) from Cambridge, UK, following a manipulated "win" or "loss" as a result of an indoor rowing contest. Baseline results revealed that men with heightened testosterone and SPMV values typically had greater inclinations toward engaging in casual sexual relationships and a higher expected likelihood of approaching attractive women in a hypothetical social situation. As anticipated, both testosterone and SPMV increased following a manipulated "victory" and were associated with heightened sociosexuality, and increased likelihood of approaching attractive women versus individuals leading to involvement with children post-race. SPMV and self-esteem appeared to mediate some of the effects of testosterone on post-race values. These findings are considered within the greater context of individual trade-offs between mating and parental effort and a model of the concurrent and dynamic androgenic and psychological influences contributing to male reproductive effort and success.

## 31. Grandmothering and Cognitive Resources Are Required for the Emergence of Menopause. Aime Carla, André Jean-Baptiste, Raymond Michel

Menopause, the permanent cessation of ovulation that occurs well before the end of the expected lifespan, remains a puzzle for evolutionary biologists. All human populations display menopause; thus, it is difficult to empirically evaluate the conditions for its emergence. We used artificial neural networks to model the emergence and evolution of allocation decisions related to reproduction in simulated populations. When allocation decisions were allowed to freely evolve, human-like patterns of somatic and reproductive senescence, including menopause and a long post-reproductive life, emerged under some ecological conditions. This result allowed us to test various hypotheses about the emergence of menopause. We found no support for the Mother Hypothesis (menopause has evolved to avoid the risk of dying in childbirth, which is higher in older women) and strong support for both the Grandmother Hypothesis (menopause allows resource reallocation to the fertility of the children and the survival of the grandchildren) and the Learning Hypothesis (the delayed benefit of investing in brain performance allows late resource reallocation to children and grandchildren). In a population where menopause has already evolved, a reduced post-reproductive life led to reduced children's fertility and grandchildren's survival. The results will be discussed in the context of the evolutionary emergence of menopause.

## 32. Shared lifetime between grandparents and grandchildren: Children with more shared years receive higher educational success. Tanskanen Antti Olavi, Lehti Hannu, Erola Jani

**Objectives:** Evolutionary researchers have shown that in traditional and historical populations grandparental presence has often been associated with increased well-being among grandchildren. Due to an increase in longevity in western countries, grandparents and grandchildren today have more shared years than ever before providing grandparents a great opportunity to increase their grandchildren's well-being. Here we investigate whether children with more shared lifetime with grandparents earn higher educational success compared to children with less shared lifetime, the topic that has not been previously studied.

**Methods:** We use high quality Finnish Census Panel data that includes information on socioeconomic and demographic factors between 1980 and 2010. Target persons are grandchildren who were born between 1970 and 1990 ( $n = 53,956$  children from 30,992 families). We apply multilevel regression models with cousin fixed effects.

**Results:** We found that children with maximum amount of shared lifetime (16 years) were 10% more often than those with minimum amount of shared lifetime (zero years) completing secondary school. There was a slight difference indicating that the shared lifetime with maternal grandparents benefited children more than that with paternal grandparents.

**Conclusions:** Children with more shared lifetime with grandparents tend to receive higher educational success than children with less shared lifetime. The study shows the benefits to measure grandparental effect by shared lifetime with grandchildren and the importance to investigate grandparental influence with cousin fixed effect method.

## 33. Contrast Sensitivity Across the Menstrual Cycle. Webb Abigail, Hibbard Paul, O'gorman Rick

An array of evidence suggests that variation in female reproductive hormones provides a functionally relevant and facilitatory effect on face perception in women, such as judgements of facial attractiveness (Gildersleeve, Haselton & Fales, 2014). However, recent meta-analyses of these findings highlight the importance of a mechanistic understanding which is currently lacking in the area (Wood et al., 2014). Here, we investigate whether visual contrast sensitivity is also affected by variations in female reproductive hormones. This could potentially underpin higher-level perceptual shifts observed in females' face perception, thereby providing a mechanistic account of these effects. The present experiment measured visual contrast sensitivity across the menstrual cycles of 21 naturally cycling women, and 14 whose ovulatory cycle had been artificially inhibited by combined oral contraceptives. Fourteen men were also included as an additional control. Visual contrast thresholds were measured for 1, 4 and 16 c/degree gratings across 3 separate intervals corresponding to cardinal phases of the menstrual cycle. Male participants were tested at equivalent time intervals. Contrast sensitivity varied according to spatial frequency, but this did not vary as a function of menstrual cycle phase or sex of participants. These results suggest that contrast sensitivity is not susceptible to fluctuations in female reproductive hormones, and therefore cannot be implicated as the visual mechanism underpinning the cycle shift hypothesis.

## 34. Education level promotes preferences for low facial adiposity in men from Colombia. Borras Martha Lucia, Perrett David, Batres Carlota

Variation in men's preferences for facial adiposity in female partners has been explained in terms of heritable health or being better equipped to survive and reproduce in harsh environments. No study, however, has examined the influence of education and violence in mate preferences. The aim of this work was to evaluate the effect of education level (highest level achieved) and violence (experiences of robberies and perceptions of danger) on preferences of Colombian men (a country with high rates of violence and illiteracy). A sample of 70 Colombian men (Mean Age=31.51 years, SD= 9.5; from the capital city and surrounding suburban areas) chose the face they considered most attractive when shown pairs of female faces consisting of a high-adiposity and a low-adiposity female face shape. The faces shown to participants were either European or Salvadoran. Afterwards, participants answered 57 questions in reference to health (e.g. access to potable water, frequency of illnesses), media access (e.g., frequency of internet use), education (e.g. graduating from high-school, attending university) and exposure to violence (frequency of robberies/attacks, feelings of danger from violence). We found that more educated men preferred low-adiposity European female faces. Violence exposure had no significant effect on adiposity preferences. Education level contributed significantly to facial adiposity preferences after controlling for age, media access, health, and violence. These preferences may reflect men's strategy to seek women of high-status and self-control. These results thus indicate that education matters in men's interpersonal attraction.

### 35. Why we need implicit measures of prosocial motivation: Findings from Evolutionary Developmental Cross-Cultural Psychology. Chasiotis Athanasios A

**Objective:** Implicit motives represent the first motivational system to be shaped in a human being's ontogeny and have far reaching consequences for the development and behavior of individuals across cultures.

**Method:** Implicit motives are measured by operant motive tests in which participants can express personal fantasies without any self-reference or restriction to actual life contexts (Kuhl & Scheffer, 2001). These tests are better qualified for assessing contents of preverbal developmental phases and manifestations of unconscious affective dispositions which emerge during childhood than explicit self-reports on motivational dispositions.

**Results:** Focusing on the prosocial component of the implicit power motive, we report results of recent empirical studies in evolutionary developmental and cross-cultural psychology on childhood context effects on parenting, generosity, and helping behavior across cultures.

**Conclusion:** Our results on childhood context effects complement empirical evidence that behavioral variation between populations is driven by environmental differences in demography and ecology rather than cultural norms on behavior (e. g. Lamba & Mace, 2011). We propose that evolutionary developmental studies on implicit motives are indispensable to understand universal and culture-specific variations in individuals' mental processes and behavior.

### 36. An Examination of Digit Ratio (2D:4D), Transgenerational Effects, Assortative Mating, Handedness, and Religiosity in a General Population Sample from South Wales. Gareth Richards, Wynford Bellin William Davies

**Objective:** The current study examined whether digit ratio (2D:4D), an indicator of prenatal sex hormone exposure, is 1) correlated between parents and offspring, 2) related to handedness, 3) associated with religiosity, and 4) likely to undergo assortative mating.

**Methods:** A general population sample ( $n= 585$ ) was recruited from members of the public attending a cultural festival in Abergavenny, South Wales. A questionnaire was administered to record demographic information and to measure aspects of religious belief. 2D:4D ratios were calculated from scans of participants' hands made via a portable photocopier.

**Results:** Digit ratios of mothers and daughters were positively correlated, though no such relationships were observed for fathers or sons. 2D:4D was not correlated between parents, and no significant associations emerged between digit ratio and either handedness or religiosity.

**Conclusions:** The findings are consistent with research showing 2D:4D to be partly heritable. However, previously reported associations between digit ratio and handedness and religiosity were not replicated here. Furthermore, no evidence of assortative mating was provided.

### 37. Childhood inequality and parental care in the development of the Dark Triad of personality. Lyons Minna, McCormick Coral, Sisya Kandazi, Williams Mimi

Childhood environment exerts pervasive influence on the development of personality traits (e.g., the Dark Triad; Machiavellianism, narcissism and psychopathy) that facilitate life history strategies. In previous studies, childhood inequality and harsh parenting have been separately demonstrated as important factors in the Dark Triad traits in adulthood.

In an on-line sample ( $N = 213$ ), we investigated the relative influence of both parental warmth and perceived childhood inequality on adult personality. High perceived inequality in childhood were associated with higher scores on Machiavellianism and secondary psychopathy. However, in a regression analysis, paternal care emerged as the only predictor of Machiavellianism and secondary psychopathy.

Our results add to the growing body of literature suggesting that parental care can mitigate the effects of material inequality in childhood. Fast life history strategies could be affected by the quality of parental care above other factors.

### 38. Social learning strategies modify the effect of network structure on group performance. Barkoczi Daniel, Galesic Mirta

The structure of communication networks is an important determinant of the capacity of teams, organizations and societies to solve policy, business and science problems. Yet, previous studies reached contradictory results about the relationship between network structure and performance, finding support for the superiority of both well-connected efficient and poorly connected inefficient network structures. Here we argue that understanding how communication networks affect group performance requires taking into consideration the social learning strategies of individual team members. We show that efficient networks outperform inefficient networks when individuals rely on conformity by copying the most frequent solution among their contacts. However, inefficient networks are superior when individuals follow the best member by copying the group member with the highest payoff. In addition, groups relying on conformity based on a small sample of others excel at complex tasks, while groups following the best member achieve greatest performance for simple tasks. Our findings reconcile contradictory results in the literature and have broad implications for the study of social learning across disciplines.

### 39. Is active grandparenting associated with the health and well-being of older adults? Danielsbacka Mirkka, Tanskanen Antti, Coall David, Jokela Markus

**Objectives:** Evidence and theory suggest that caregiving may provide direct health benefits for the helper. Recently, several studies have investigated whether grandparents who look after their grandchildren receive health benefits in return. Studies have found support for this association, however, they focus on random effects: on average grandparents who look after their grandchildren are healthier and live longer. Here, we conduct a within-person analysis to explore whether active grandparenting is associated with the subsequent health and well-being of grandparents over time.

**Methods:** We used follow-up waves (2004–2013) of the longitudinal Survey of Health, Ageing and Retirement in Europe ( $n = 32,340$  person-observations from 21,061 unique persons). Subjective health and well-being was measured as self-rated health, difficulties with activities of daily living (ADL), depressive symptoms, life satisfaction and meaning of life scores. Active grandparenting was measured as grandparental childcare. We used multilevel ordinary least squares regression models where the repeated measures (i.e., person-observations) are nested within responding persons. We run both between-person (effects represent the results across individuals) and within-person (effects show the individual's variation over time) models.

**Results:** Across all outcomes, grandparental childcare was associated with improved health and well-being. However, almost all correlations were based on between-person effects. Only for ADL limitations did within-person associations exist.

**Conclusions:** Associations between grandparental childcare and health and well-being are mostly due to between-person rather than within-person effects. The health benefits of active grandparenting should be investigated further to establish what mediates these associations because our results indicate they may not be causal.

### 40. Differences in human extra-pair paternity behaviour in urbanised versus rural populations. Larmuseau Maarten, Decorte Ronny, Claerhout Sofie, Gruyters Leen, Wenseleers Tom

When the caring father is not the biological one, a so-called extra-pair paternity (EPP) event occurs. Seeking out EPP could for various reasons be a viable reproductive strategy for both females and males in many pair-bonded species, including humans. Recent studies estimated current and historical EPP rates in several human populations worldwide. Although the average EPP rates over the last 400 years are equally low in the studied populations (in the range of 0.5–2%), the EPP frequency may still differ significantly over time and in space due to several evolutionary, cultural and socio-demographic factors. Here we studied the effect of urbanisation on EPP behaviour by estimating the historical EPP rate within cities versus rural populations in West-European Flanders (Belgium). The historical EPP rate for each type of population was estimated by comparing in-depth Y chromosomal variation between hundreds of legally assumed patrilineally related men or so-called genealogical pairs. Using the genetic genealogical approach we observe a significantly higher EPP rate in cities versus rural populations. According to the life history theory, it is clear that next to various ethnic, religious and socioeconomic backgrounds also the degree of urbanisation shaped variation in EPP rates among populations.

**41. The peasants are revolting! Collective action and reverse dominance in a modified ultimatum game.**

**Gordon David, Puurtinen Mikael**

Reverse dominance is the primary mechanism behind the egalitarianism of non-state societies. However, it represents a collective action dilemma for subordinates. Using our Tyrant/Peasant game (modified ultimatum game), we investigated how the need for collective action affects the suppression of dominants. 192 participants played in fixed groups of 4 with one Tyrant (Proposer) and 3 Peasants (Responders). Tyrants could send up to 100 points, with each Peasant receiving a third of that amount. Peasants could reject the offer by contributing up to 10 points each to a collective pot; the greater the total, the greater the chance of rejection. In the 'Easy' condition, a small allocation of points by a single Peasant was sufficient to reject an offer; in the 'Hard' condition, considerable allocations by all Peasants was required; the 'Medium' condition sat between the two; and in a control condition no rejection was possible. Participants played 20 rounds of the game. Compared to the Hard/control condition, Tyrants increased their offers significantly in the Easy condition, and experienced more rejections. As a result, Peasants earned more in those conditions. A minority of peasants also forced offers higher than 'equal' in the Easy condition. We show that when costly collective action is required, reverse dominance does not take place. This may suggest egalitarianism is an ecological outcome rather than an evolved trait per se. Egalitarianism may have first required tools that allowed for the easy deposition of dominants, either physical (weapons) or socio-cognitive (ability to gossip, hurt reputation)

**42. Social diffusion of gasoline motors among riverine horticulturalists. Beheim Bret, Kandler Anne,**

**McElreath Richard, Gurven Michael, Kaplan Hillard**

The integration of small-scale societies into larger market economies is a central fact of modern anthropology, and connects to the emergence of inequality, the spread of norms of risk buffering and cooperation, the loss of biological and informational diversity associated with subsistence lifestyles, and population shifts in health outcomes. Yet still very much remains unknown about market integration as a process, especially what social and individual learning processes inform decisions towards market-oriented lifestyles. These limitations are partly due to the fact that, with a few exceptions, almost all anthropological work on market integration has been cross-sectional. This particular study examines the diffusion of boat motors among Tsimane' communities of lowland Bolivia from 2007 to the present. While this process has been going on, the Tsimane' have been the subjects of long-term anthropological field studies documenting individual health, economic activity, reproductive decision-making and social interconnectedness over time. Using this longitudinal dataset, we attempt to measure the extent to which this particular diffusion process can be understood by different economic and social learning mechanisms.

**43. Men's preferences for women's body odours are not associated with HLA. Lobmaier Janek, Probst**

**Fabian, Fischbacher Urs, Wirthmüller Urs, Knoch Daria**

**Objective:** Body odours allegedly portray information about an individual's genotype at the major histocompatibility complex (MHC, called HLA in humans). While there is strong experimental support for MHC-associated mating behaviour in animals, the situation in humans is more complex. Previous studies have suggested that women prefer the scent of men with dissimilar HLA to their own. To date only very few studies have looked at HLA-linked olfactory preferences in men and these studies have revealed inconsistent results. Here we investigate men's HLA-associated preferences for women's body odours.

**Methods:** In contrast to previous studies, body odours were gathered at peak fertility (i.e., just before ovulation) when any HLA-associated odour preferences should be strongest. We scrutinized whether men's preference for women's body odours is modulated by (1) the number of shared HLA alleles between men and women, (2) HLA heterozygosity, and (3) the frequency of rare HLA alleles.

**Results:** We found that men could readily differentiate between odours they found attractive and odours they found less attractive, but that these preferences were not associated with HLA. Specifically, men did not prefer odours from women who are HLA dissimilar, HLA heterozygous, or who have rare HLA alleles.

**Conclusions:** Despite adopting rigorous methodology and a large sample size, we found no evidence that men prefer odours from women who are MHC dissimilar, MHC heterozygous, or who have rare MHC alleles. Together, these findings suggest that HLA has no effect on men's mate preferences.

**44. The Missing Link? Individual Differences in Moral Disgust Do Not Predict Utilitarian Judgments, Sexual and Pathogen Disgust Do. Laakasuo Michael, Sundvall Jukka, Drosinou Marianna**

The role of emotional disgust and disgust sensitivity in moral judgment and decision-making has been debated intensively for over 20 years. Until very recently, there were two main evolutionary narratives for this rather puzzling association. One of the models suggest that it was developed through some form of group selection mechanism, where the internal norms of the groups were acting as pathogen safety mechanisms. Another model suggested that these mechanisms were developed through hygiene norms, which were piggybacking on pathogen disgust mechanisms. In this study we present another alternative, namely that this mechanism might have evolved through sexual disgust sensitivity. We note that though the role of disgust in moral judgment has been questioned recently, few studies have taken disgust sensitivity to account. We present data from a large sample ( $N = 1300$ ) where we analyzed the associations between The Three Domain Disgust Scale and the most commonly used 12 moral dilemmas measuring utilitarian / deontological preferences with Structural Equation Modeling. Our results indicate that of the three domains of disgust, only sexual disgust is associated with more deontological moral preferences. We also found that pathogen disgust was associated with more utilitarian preferences. Implications of the findings are discussed.