

POSTERS: SESSION 1 (by first author's last name)

Change in men's fundamental frequency predicts aggressive behavior

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Introduction: Men who experience an increase in testosterone following competition tend to behave more aggressively in future competitions. Fundamental frequency (F0), the characteristic closely associated with vocal pitch, is negatively related to men's testosterone levels. Men who perceived themselves as dominant lower their voice pitch during competitive interactions. To date, no research has analyzed how success in competition alters men's F0, or how alterations in F0 are related to future aggressive behavior.

Methods: Eighty men were recorded saying the phrase "Hi, my name is John Smith" before and after a competitive success manipulation (success in a video game competition). Participants subsequently provided a second voice recording, followed by the Point Subtraction Aggression Paradigm (PSAP) played against an intrasexual rival.

Results: Men's F0 was assessed before and after the competitive success manipulation. There was no overall group difference between F0 prior to the competitive success manipulation ($M = 114.80$, $SD = 17.91$) and after ($M = 116.48$, $SD = 16.95$), $t(78) = -1.51$, $p = .14$, dependence-corrected Cohen's $d = -0.170$). We next examined within-subject changes in F0 (F0 before minus after competitive success) as a correlate of both provoked and unprovoked aggression toward a member of the same sex in the PSAP. Men who lowered their voices most, relative to their baseline F0 pre-competitive success, showed more provoked ($r = -.23$, $p = .04$) and unprovoked ($r = -.24$, $p = .03$) aggression toward other men.

Conclusion: Decreases in men's F0s may predict future aggressive behavior.

Perfumers' perceptions of body odours: a new scale for odour description

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Human axillary odours are multi-faceted and communicate a wide range of information, from stable traits such as sex and symmetry through to those which fluctuate such as emotions, health, and fertility status. This is possible because axillary odour is comprised of hundreds of individually variable volatile compounds. Despite this, studies investigating the perceptual qualities of body odour use a very limited range of descriptors. To address this discrepancy, we describe an attempt to develop a fuller and more nuanced scale to describe the diversity of odour quality, working alongside professional perfumers to benefit from their expertise in semantic odour labelling. Perfumers initially developed a list of 15 verbal descriptors after smelling axillary samples from 4 individuals (2 men, 2 women). They then used these descriptors to assess 62 axillary odour samples (31 women, 31 men) collected under standardised conditions. We found that ratings using some of the verbal descriptors distinguished between male and female samples at above-chance levels. The continued development of this scale could enable improved understanding of other perceptual qualities of human odour, potentially making it possible to link specific perceptual qualities to other biologically meaningful

cues (e.g. symmetry, fertility) or to manipulate odours based on perceptual qualities in experimental settings, and has direct practical implications for fragrance designers.

Analysis of seductive behavior of female detainees in non-sexual contexts – An evolutionary approach

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By being a closed environment in terms of social alternatives (i.e. coalition formation and finding sexual partners), prison environment might stimulate the female prisoners to use at maximum capacity their evolved abilities in order to survive and optimally adapt to the new contexts. In prison, apart from having to cope with the physical specificity of the environment, new people who are submitted might unconsciously assess the physical attributes of individuals with whom they have contacts inside the penitentiaries, including the personnel. In our study, we address the psychological evaluation in prison in terms of the interaction between convict (female) – psychologist (male), targeting the analysis of the non-verbal indicators of seductive behavior displayed by the convict. We performed the content analysis of recorded videos of 33 interviews of newly convicted women ($n=33$, age between 19 to 52 years), incarcerated in Arad Maximum Security Penitentiary, Romania. The analysis was based on non-verbal behavioral elements, such as facial micro-expressions, postural and voice changes, position of hands etc., in relation to demographic data related to the individual inclusive fitness, such as physical and mental health, marital status, access to social support, records of suicidal attempts, frequency of self- and hetero-aggressive behaviors etc. Our data indicate that the occurrence of seductive behavior elements during the psychological assessment performed by a male psychologist was higher in those female detainees with high values of individual fitness-related variables. The results are discussed from several evolutionary theories and from the perspective of their applied therapeutic value.

Do transgender people choose their mates according to their biological sex or their gender identity?: A study in Argentina

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Transgender people provide a unique opportunity to examine the effect of biological sex versus the effect of gender identity on mating preferences. The aim of the study was to identify the mate characteristics that are valued by transgender people and to examine if these mate preferences vary as a function of biological sex or their gender identity. A convenience sample of 134 (58.8%) male-to-female individuals (MTF) and 94 (41.2%) female-to-male individuals (FTM) from Buenos Aires completed a questionnaire (M age=29.21, SD age=7.99) and rated Buss's (1990) list of 18 mate attributes and an additional item. The data were compared with the results from heterosexual and homosexual samples.

The most valued characteristics were mutual attraction-love, having a dependable character, a pleasant disposition and being sociable; while the least desirable mate attributes were chastity and sharing religious beliefs, a similar political background and educational level. However, compared to FTM participants, MTF participants, placed significantly more emphasis on attributes related to attractiveness (good look, good health) and socio-economic status (ambitious, industrious, favourable social status,

financial prospects); and FTM participants, more than MTF participants, valued a partner with a dependable character.

Furthermore, transgender people valued in part the same attributes in a potential mate as heterosexual and homosexual people with the same biological sex, and in part attributes in line with their gender identity.

Using the whole instead of the parts: Conjoint Analysis and Mate Choice Trade-offs

Jaime Benjamin (University of Dundee), Fhionna Moore

Examining trade-offs can quickly become an insurmountable task when attempting to see how different levels of several attributes affect mate desirability. Conjoint analysis (CA) is a multivariate analysis that is typically used in marketing research and may help eliminate control issues and biases (Green & Srinivasan, 1978; Luce & Tukey, 1964). There exists a discrepancy between stated mate preferences and actual mate choice. This is evident in several speed-dating studies (Eastwick and Finkel, 2008; Kurzban & Weeden, 2005). The stated mate preferences often used in research are the evaluation of individual mate characteristics, while mate choice is the evaluation of a person as a whole. CA is used to examine how several attributes factor into an overall choice. In mate-preferences research, CA is extremely underutilized. Mate-preference research typically uses a 'compositional' approach, in which predictions incorporate effects of independent on dependent variables (Hair, Anderson, Tatham, & Black, 1995). 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 of CA, looking at stated mate preferences and choice-based measurements of preference, while examining correlates of sexism, financial independence, social status. Results are discussed with regard to evolutionary and sociobiological theories.

Preferred Women's Waist-to-Hip Ratio Variation over the Last 2,500 Years

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The ratio between the body circumference at the waist and the hips (or WHR) is a secondary sexual trait that is unique to humans and is well known to influence men's mate preferences. Because a woman's WHR also provides information about her age, health and fertility, men's preference concerning this physical feature may possibly be a cognitive adaptation selected in the human lineage. However, it is unclear whether the preferred WHR in western countries reflects a universal ideal, as geographic variation in non-western areas has been found, and discordances about its temporal consistency remain in the literature. We analyzed the WHR of women considered as ideally beautiful who were depicted in western artworks from 500 BCE to the present. These vestiges of the past feminine ideal were then compared to more recent symbols of beauty: Playboy models and winners of several Miss pageants from 1920 to 2014. We found that the ideal WHR has changed over time in western societies: it was constant during almost a millennium in antiquity (from 500 BCE to 400 CE) and has decreased from the 15th century to the present. Then, based on Playboy models and Miss pageants winners, this

decrease appears to slow down or even reverse during the second half of the 20th century. The universality of an ideal WHR is thus challenged, and historical changes in western societies could have caused these variations in men's preferences. The potential adaptive explanations for these results are discussed.

Face up to it: The dark triad of personality and appropriateness of emotional responses

Charlotte Brockman (University of Liverpool), Minna Lyons

Objective: The Dark Triad of personality (i.e., psychopathy, narcissism, and Machiavellianism) is a constellation of personality traits, characterised by manipulation and deceitfulness. These traits are accompanied by emotional deficits, which may have co-evolved with the fast life history "cheater strategy" embodied by these traits. This study investigates the Dark Triad of personality in relation to emotion expressivity (EE) and appropriateness of emotional responses when primed with an emotion evoking clip.

Method: Participants completed an online study, filling in questionnaires on the Dark Triad and expressivity. They also viewed validated emotion evoking video clips on sadness, fear, and happiness. After viewing each clip, participants were shown faces depicting the same emotions, and they were asked to rate, on a Likert scale, the extent to which they identified with the emotions.

Results: Results indicate that for people viewing the sad clip, EE and narcissism related to higher sadness responses, whereas Machiavellianism and EE related to higher intensity of fear. For the fear clip, EE related to higher intensity of fear, psychopathy related to low fear and high happiness. The happy film clip revealed EE to be related to higher intensity of happiness.

Conclusion: Our findings suggest that high EE and narcissism relate to appropriate responses to sadness, suggesting that narcissism is "less dark" than the other two traits. Psychopathy had an association with happiness and low fear when viewing fearful clips, which could be an adaptive feature associated with a fast life history strategy.

Are mothers less likely to initiate breastfeeding in harsh environments in the UK? A life history analysis.

Laura J Brown (London School of Hygiene & Tropical Medicine), Rebecca Sear

Objective: Life history theory predicts that parental investment may be lower in harsh environments. Using breastfeeding initiation as a measure of parental investment we test whether environmental quality is correlated with the likelihood of breastfeeding initiation in the UK's Millennium Cohort Study. We then go on to determine whether environmental quality influences the known socioeconomic status (SES) gradient in breastfeeding in the UK, where lower SES is associated with lower rates of breastfeeding.

Methods: We ran logistic regression models to explore the associations between environmental quality, SES and breastfeeding initiation. We used factor analysis on physical and sociocultural variables to create both an objective (based on observer-rated neighbourhood assessments) and a subjective (based on respondent opinions) measure of environmental quality.

Results: As predicted, objective environmental quality was significantly associated with breastfeeding initiation: women living in poorer quality environments had lower probabilities of breastfeeding initiation. Subjective environmental quality, however, was not significantly associated with breastfeeding initiation after controlling for potentially confounding variables.

Environmental quality and SES independently predicted breastfeeding initiation. Environmental quality had more of an effect on breastfeeding initiation for low SES women than high SES women and living in a high quality environment seems to offset some of the negative influence of low SES on breastfeeding initiation.

Although environmental quality did not significantly interact with SES to influence breastfeeding initiation, significant three-way interactions were found between SES, objective environmental quality and location.

Conclusions: Our results supported the hypothesis that breastfeeding rates would be lower in harsh environments, though only when objective, not subjective, measures of environmental quality were used. We further found somewhat complex associations between environmental quality, SES, location and breastfeeding initiation. These suggest firstly that both individual condition and environmental quality influence breastfeeding initiation, and secondly that other contextual factors also have an important role to play.

Head tilt, eye gaze, sexual dimorphism, dominance and attractiveness

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Burke and Sulikowski (2010) showed that the forward or backward head tilt angle (pitch) of a face influenced both attractiveness and masculinity/femininity ratings. Face pitch has also been shown to impact dominance ratings, as has eye gaze direction. The current study was designed to investigate whether the effect of face pitch on attractiveness and masculinity/femininity was driven by changes in perceived dominance. Twenty male and 29 female participants rated 220 faces that were manipulated for eye gaze (direct vs averted) and 11 different head tilts, for attractiveness, femininity, masculinity, physical dominance and social dominance, to examine the way each of these rating varied as a function of face pitch. For female faces, perceived femininity and perceived attractiveness tracked each other perfectly, across changes in pitch, whereas perceived social and physical dominance monotonically increased as faces tilted further back. For male faces, tilting faces further back produced monotonic increases in perceived social dominance and masculinity, but opposite quadratic functions for perceived physical dominance and attractiveness.

Intimate violence in Nicaragua is related with life history, intrasexual competitiveness and mate value, but not with mate guarding

Abraham Buunk (University of Groningen and University of Curaçao)

This study examined the determinants of domestic violence in the Department of the Rio San Juan in Nicaragua, using an adapted version of the Conflict Tactics Scale (CTS2; Straus, Hamby, Boney-McCoy & Sugarman, 1996). Respondents were 199 men and 201 women, with a mean age of 38.38 years for men and 34.57 for women. There was a considerable variation in civil status, educational level and type of profession. Of the men 35% and of the women 33% had committed at least one act of minor violence (such as

pushing, shoving or slapping one's partner) and 30% of the men and 25% of the women had committed at least one act of serious violence (such as twisted one's partner's arm, beating up one's partner). According to themselves, men had engaged much more often in severe violence than women, and had more often inflicted serious injury on their partner. Overall, among men, violence against one's partner was independently predicted by (1) intrasexual competitiveness; (2) a short-term life history; (3) a low mate value; (4) a bad relationship with one's mother, and (5) a low income. In contrast, among women violence against one's partner was only predicted by intrasexual competitiveness. Unlike what was predicted, mate guarding was not related to domestic violence among men nor women. The results are discussed from an evolutionary perspective, and implications for prevention are presented.

The Shape of Names to Come: Predicting the Cultural Evolution of Baby Names

Daniel Cownden (University of St Andrews), Kevin Laland

The dynamics of baby names provide a rich data set for investigating the psychological drivers of cultural evolution. Previous research has established that the evolution of a name's popularity is sensitive to: the current popularity of the name, the rate of change of popularity of the name (Berger et Al., P. Natl. Acad. Sci. USA 2009), and the popularity of similar sounding names (Berger et Al., Psychol. Sci. 2012). These findings suggest that Berlyne's hypotheses about how novelty and complexity interact to affect hedonic value (Percept. Psychophy. 1970) are important drivers of cultural change. As discussed by Martindale (*The Clockwork Muse: Predictability of Artistic Change*, 1990) and Schmidhuber (J. SICE 2009) Berlyne's hypotheses imply that, all else being equal, cultural variants that lie between too familiar and hence boring, and too novel and hence strange, will spread most effectively. When this tendency to choose intermediate levels of novelty is considered in aggregate at the population level, it is predicted to produce directed trends within the design space of cultural variants. To test these hypothesis requires mapping cultural variants, in this case names, into a structured design space where the direction and distance from one name to another, e.g. from "John" to "Josh", can be evaluated. We construct such a mapping using the recently developed technique of Kingma and Welling (arXiv 2013). Using this mapping we show that individual preference for intermediate levels of novelty is a plausible driver of cultural change, and leverage this finding to improve name frequency predictions.

Medicine as message: Costly signalling theory and the evolution of harmful medicine

Micheal de Barra (University of Aberdeen), Daniel Cownden

Illness or injury often leaves people incapacitated for long periods. For example, Sugiyama (Am. J. Phys. Anthropol. 2004) reports that more than 60% of Shiwiar forager-horticulturists had spent a month or longer unable to care for themselves or their dependants. Caregiving - the provision of food, shelter and other support to another person - is an important medical practice that enables ill or injured people and their dependants to survive these periods. However, caregiving is vulnerable to exploitation via illness deception, where people feign illness in order to gain access to care. We propose that harmful and unpleasant medical treatments - a common feature in medicine across cultures - help to solve the problem of illness deception. As costly demonstrations

of ones' need for care, they enables caregivers to distinguish people who are ill from people who are engaging in illness deception. To explore the assumptions and predictions of this theory, we develop a formal model of the underlying cooperative problem. Results indicate that when health status is opaque, caregiving is eroded by illness deception. However, when costly signals (unpleasant or aversive medicines) are introduced, caregiving can persist because truly ill people (who gain substantially from caregiving) but not illness deceivers (who gain less from caregiving) are willing to pay the signalling cost. Results of the model are discussed in light of the anthropological and medical literature. Poisoning, cannibalism, emetics, bloodletting and other such treatments may be solutions to the problem of allocation of resources to people with unclear need.

Visual Cognition and the Hunter-Gatherer Hypothesis

Antonia D C D'Souza (University of Essex), Paul Skarratt, Kevin Dent, Geoff G Cole

The hunter-gatherer theory of human cognition posits that males and females have been selected for abilities associated with hunting and gathering. This notion was put forward as an explanation for the findings that females tend to perform better on tasks concerned with object location memory whilst males perform better on tasks concerned with navigation. Although the hunter-gatherer notion has become influential within evolutionary psychology, surprisingly little work has examined the theory in the context of visual cognition. In two experiments we tested the theory by assessing whether females, as gatherers, are more sensitive to peripheral stimuli and whether males, as hunters, are better at tracking moving objects. In accordance with hunter-gatherer predictions, these were also examined with stimuli presented in near and far visual space. Results found a significant effect of visual space, but no sex differences in either experiment. The hunter-gatherer theory was not therefore supported.

Perceived childhood inequality predicts schizotypy in adulthood: An evolutionary perspective

Yasmin Edwards (University of Liverpool), Minna Lyons

Objective: Previous research has highlighted that inequality can serve as a causal predictor of mental distress. However, the relationship between objective and subjective social rank and schizotypy – a personality trait that is associated with vulnerability to mental distress – has not yet been investigated. Thus, in the present study, we looked at the relative contribution of childhood objective and subjective social rank in relation to schizotypy in adulthood.

Method: In an online sample of 365 non-clinical volunteers based in the United Kingdom, we measured participants' subjective recollections of their childhood status in relation to others as well as using postcode data to reconstruct an index of socio-economic status in childhood. A questionnaire measure was used to assess schizotypy at the present moment in adulthood.

Results: We found that the subjective, rather than the objective measure of status was a significant predictor of all the dimensions of schizotypy: Introvertive Anhedonia, Impulsive Nonconformity, Cognitive Disorganisation and Unusual Experiences.

Individuals who had high objective, and low subjective status had higher scores in Cognitive Disorganisation.

Conclusion: Our findings can be interpreted in light of social rank theory, which is consistent with an evolutionary based “involuntary defeat syndrome” linking social status with mental distress which, in turn, may present as symptoms of affective disorders.

The dark triad and lie detection accuracy

Sian Fairhurst (University of Liverpool), Minna Lyons

It has been suggested that the Dark Triad of personality (i.e., Machiavellianism, narcissism, and psychopathy) is an adaptation to exploit others. The dark triad personality traits hold characteristics such as manipulation, seeing social paradigms scenarios as games of strategy and view things purely in terms of value exchange to gain advantage over others.

Research has shown that these traits consist of inter-personal deficits (i.e., low empathy), which could be useful in ability to detect deceit in others. In the present study, we investigated the relationship between the Dark Triad, and lie detection accuracy and confidence. In an online study, participants (N = 236) completed a 27-item Dark Triad questionnaire, and watched 20 real life, high-stakes emotional video clips. Participants had to discriminate between lies and truths in each video clips, and rate how confident they were in their judgement. We found small, significant positive correlations between Machiavellianism, bias-free accuracy (d prime), and self-rated confidence. In a regression analysis, Machiavellianism emerged as the only positive predictor of accuracy. Our results suggest that out of the three Dark Triad traits, Machiavellianism may be the most successful cheater strategy, as the ability to judge the truthfulness of others could be invaluable in gaining benefits in social interactions. We discuss the results in terms of evolutionary bases for individual differences in lie detection, and the cognitive adaptations of manipulative personalities.

The effect of contest outcome and affective states on testosterone and cortisol levels in MMA fighters

Jitka Fialová (Charles University and National Institute of Mental Health, Czech Republic), Vít Trěbický, Jan Havlíček

Previous research has shown that competitive encounters elicit hormonal changes which are then further influenced by the outcome of the competition. Several studies reported significant increase in testosterone (T) and decrease in cortisol (C) levels in winners, although some studies have found contradictory results. There are several factors which might be, at least partly, responsible for these findings; from individual differences in motivation to win the contest to differences in the nature of the competition (some physically demanding, some not). We carried out a study employing mixed martial arts (MMA) fighters to investigate the effect of winning or losing on their hormonal levels, while including the modulating effect of affective states here conveyed by their individual motivation to win. We obtained T samples from 19 males and C samples from 11 males before and after the fight. Each time all participants also assessed their moods using PANAS questionnaire (consisting of Positive and Negative Affect score). Our results showed no significant differences in reactive T levels between winners and losers.

However, we found significant increase in C levels in winners, but not in losers. Moreover, changes in C levels were positively associated with changes in Positive Affect score. Physical confrontations represent both physically and psychologically demanding events, thus increase in C levels in winners might be the outcome of greater effort and stress experienced which is consistent with several previous studies. This finding is further supported by positive association between increase in C levels and positive mood after the fight.

The role of personality and skewed adult sex ratios on sexually coercive tactics

Emma Gilbert (University of Liverpool), Minna Lyons

Coercive mating tactics are influenced by environmental cues of mate availability (e.g., adult sex ratio), along with individual differences (e.g., the Dark Triad of personality). In the present study, we use a priming technique in order to test the role of skewed adult sex ratios, the Dark Triad (i.e., Machiavellianism, narcissism, and psychopathy), and sexually coercive tactics.

Participants were allocated to read an article where finding a mate was either easy or hard. Participants were asked to recall as much information about the article as possible, and then requested to complete a second “unrelated” study, which tested sexually coercive attitudes (Struckman-Johnson et al, 2003) as well as the Dark Triad of personality (Jones & Paulhus, 2014).

In the mate scarcity condition, psychopathy related positively to sexual coercion. In the mate abundance condition, Machiavellianism was positively related to sexual coercion. Narcissism was unrelated to sexual coercion in both conditions.

The role of skewed adult sex ratios may increase sexually coercive attitudes depending on traits of the Dark Triad. It may be that the evolutionary benefits of high psychopathy or Machiavellianism affect the use of sexually coercive strategies, depending on mate availability. Those high in Machiavellianism may use more sexually coercive strategies if short-term relationships are more accessible, due to an interest in being sexually successful with an abundance of mates. Those scoring high in psychopathy may use more sexually coercive tactics when mates are scarce, in order to enhance their chances of mating in unfavourable circumstances.

Sensation seeking and women’s preference for Dark Triad male faces

Jessica Green (University of Liverpool)

Does a woman’s personality influence their choice for a riskier male as a potential mate? We examined the role of women’s sensation seeking on their preference for high and low Dark Triad (i.e., Machiavellianism, narcissism and psychopathy) male facial morphs in short and long-term relationships. In an on-line study, women (N = 356) chose between high and low Dark Triad faces in a two-alternative forced choice task, as well as completed a sensation seeking questionnaire. We found that overall, women showed aversion to high Dark Triad males irrespective of sensation seeking and relationship context. High sensation-seeking tendencies were significantly, negatively correlated with a preference for narcissistic facial morphs as potential long-term partners. Previously, promiscuity has been linked to sensation seeking (Donohew et al, 2000), which indicates that sensation seeking women are likely to be more sexually experienced. Research shows

that narcissistic men put themselves first, and are selfish within relationships (Campbell, Reeder, Sedikides & Elliot, 2000) leading to a lack of commitment (Campbell & Foster, 2002). Our findings suggest that high sensation seeking females may have experienced a potential relationship history with narcissistic males, and have therefore learned that these men are not a compatible match for serious relationships.

The perfume-body odour complex: An insightful model for culture-gene coevolution?

Jan Havlíček (Charles University), Caroline Allen, Agnieszka Sorokowska, Piotr Sorokowski, Markéta Sobotková, Jitka Fialová, S. Craig Roberts

Cross-culturally, people use fragrances which may affect the outcomes of social interactions. It has been suggested that fragrances might mask body odours or interact with them in an idiosyncratic fashion. To test these competing hypotheses we performed a series of experiments involving: i) individual body odour discrimination, ii) attribution of personality characteristics and iii) possible kin advantage in perfume selection. In each study, we compared judgements of the body odours alone and fragrance-body odour blends. In study I, odour donors used either no fragrance, assigned fragrance or self-selected fragrances. Discrimination rates were highest in the “no fragrance” condition, followed by “own fragrance” and lowest (but significant) in the “assigned fragrance” condition. In study II, the odour donors completed the Big Five questionnaire and provided “no fragrance” odour samples and body odours blended with their own fragrance, which were then rated for personality characteristics. We found a significant association between self-reported and odour-based judgements of neuroticism and dominance in the “no fragrance” condition; while only dominance showed this association in the “own fragrance” condition. In study III, we tested whether a fragrance selected by kin (sisters) or non-kin (girlfriends) was perceived as more pleasant compared with a selection made by target men. We found that the body odour blended with fragrances selected by girlfriends or sisters were rated as more pleasant than those selected by the target men. Together, our results support the interaction hypothesis and suggest that the perfume-body odour complex is a potentially insightful model for culture-gene coevolution.

Carotenoids as a cue to human health: acute illness reduces plasma but not skin levels

Audrey Henderson (University of St Andrews), Julie Lasselin, John Axelsson, David Perrett

Carotenoids are a range of yellow to red plant based pigments. When consumed, they have the ability to colour human skin in a manner that is generally perceived as healthy and attractive looking. Whether carotenoid colouration of human skin is related to health beyond diet is largely untested although in numerous other species carotenoid ornaments are accepted as a sexually selected signal of health status.

We tested the hypotheses that current and acute illness would reduce plasma carotenoids and reduce carotenoid colouration of human skin (measured spectrophotometrically). In a within-subject, repeated design, participants were injected with either lipopolysaccharide (LPS) or a saline placebo and monitored for 8 hours in a hospital setting. The activation of the immune system following an injection of LPS was associated with a temporary drop in skin redness and yellowness (1-3hr post-LPS) and a

lasting drop in plasma carotenoids (3-8hr post-LPS). The temporary change in skin colouration likely reflected changes in blood perfusion and oxygenation status. In a follow-up perceptual study, cropped photographs showing patches of forehead and cheek skin at baseline and 1 hour after LPS did not differ in perceived healthiness.

Our findings suggest that acute or rapid changes in health status are reflected in skin blood perfusion but not in carotenoid colouration of human skin. Illness did in this instance reduce plasma carotenoids and so it is likely that prolonged or regular instances of ill health would eventually be reflected in a loss of carotenoid colouration of skin.

Making your skin crawl: The role of tactile sensitivity in disease avoidance

David Hunt (University of Bristol), Nicholas Davenhill, Grace Cannell, Diana Fleischman, Justin Park

Many types of infectious diseases can be transmitted through the skin (e.g. malaria from mosquito bites). As the skin forms an anatomical barrier between us and the external world, it is possible that we have evolved mechanisms that promote the detection and avoidance of infection risks in the tactile domain of perception. Two studies tested whether exposure to disgust-evoking stimuli promotes a change in tactile sensitivity (TS), a physiological change that may be specifically designed to detect the location of any potential infection risk. In Study 1, participants had their TS measured with monofilaments on their forearm. They were then shown either a disgust-evoking stimulus (maggots) or a neutral stimulus (rice), and a second TS measurement was taken. Study 2 was a conceptual replication of Study 1, but included the additional condition of disease-irrelevant threat, which was done to rule out any positive findings being explained by general negative arousal. Results from both studies demonstrated that people showed higher TS in the disgust condition when compared to controls. These results suggest that disgust-evoking stimuli engender physiological changes in tactile sensitivity, in a manner that may neutralize infection risks. Furthermore, results from Study 2 rule out the possibility that these findings were due to general negative arousal.

Did the practice of Partible Paternity select for Emotional Intelligence? A systematic review of Ritual Couvade in lowland Indigenous Amazonian societies

Giuseppe Innamorato (Umeå University)

Here I address the costly behavior (Amotz Zahavi: 1979) of ritual couvade amongst Amazonian Indigenous populations within the context of Partible Paternity (Beckerman et al., 1998; Beckerman et al., 2002; Beckerman & Valentine, 2002). By considering the present-day Amazonian foragers as a working model for our evolutionary past, I suggest that paternity confusion is the optimal stressor condition for the emergence of the cognitive traits at the base of male enhanced empathic behavior display. Given Indigenous males inability to determine paternity, I propose that the ritual couvade, which is an attempts to portray a distinctive male empathic commitment towards the pregnant mother, might have selected towards the evolution of emotional intelligence. By self-inflicting great costs during primipara indigenous co-father mimic birth-giving with the ultimate purpose to become selected for the genetic father role during subsequent pregnancies in exchange for committing increased paternal responsibility towards the present child of indeterminate genetic origin. Three hypotheses are compared. First, that in patrilineages ritual couvade is an exclusive formal sanctioning of the primary father,

which provides no biological advantages to the performer. Second, that in matrilineages, secondary fathers are encouraged to perform ritual couvade to gain indirect genetic benefit by displaying emotional commitment. Third, that in ambilateral groups women form philopatric residential clusters preferring non-fraternal polyandrous marriages. The data review showed that in ambilateral groups believing in Partible Paternity, women tended to enlist kinsmen as husbands weakening ritual couvade of the evolutionary force required for the emergence of emotional intelligence.

Do survival and social processing improve recall?

Ángel V. Jiménez (Durham University)

A growing body of research has embraced an evolutionary perspective on human memory. Previous studies have shown a recall advantage for survival and social processing. However, these studies have not compared the effects of survival and social processing on recall using the survival processing paradigm. The goal of this poster is to compare the memory of both processing conditions against each other as well as against a third processing condition (self-reference). In accordance with previous literature, it was expected that survival processing would improve recall in comparison to self-reference processing. It was also hypothesized that social processing would improve recall over survival and self-reference processing. In study 1, 40 participants aged 22-59 rated a list of 147 words according to their relevance to a survival and a social scenarios. The goal was to select a subset of 30 of these words and control the effects of relevance on recall. In study 2, 39 participants aged 18-60 were assigned to one of three experimental conditions: survival, social or self-relevance scenario. Contrary to the expectations, it was not possible to find a recall advantage for the survival or social processing conditions. Nevertheless, an interesting result emerged: the social relevant words were recalled in greater extent independently of the processing condition.

Do we practise when we dream? Relationship between sexual and aggressive dream content, and the Dark Triad of personality

Shelley Khan (University of Liverpool), Minna Lyons

Objective: Evolutionary theories indicate that dreaming has a function in simulating environmental threat. As well as preparing for danger, it is possible that features of our everyday life could be rehearsed during dreaming. Those possessing high Dark Triad personality traits (i.e., narcissism, psychopathy, and Machiavellianism) may prepare for aspects of their waking life that link to their exploitive lifestyles, such as sex, aggression and manipulation. In the present study, we aim to investigate the relationship between the Dark Triad of personality and dream content.

Methods: Participants (N = 308) completed two online questionnaires: The Short Dark Triad (Jones & Paulhus, 2014), and the sex and fighting subscales from the Dream Motif Scale (DSM; Yu, 2012). Questionnaire order was randomised.

Results: We found significant positive correlations between the Dark Triad scores and frequency of dreaming about sex and fighting. This relationship was localised to psychopathy, which emerged as a significant positive predictor when the shared variance between the Dark Triad traits was controlled for.

Conclusion: Our results indicate that especially psychopathy has an association with dream content relating to fighting and sex. Previous research has shown that out of the three Dark Triad traits, psychopathy has the strongest relationship with aggression, violence, and sexually coercive strategies. We provide the first evidence to suggest that individuals may practise exploitive social strategies when dreaming, and that this has an association with their personality traits.

Can social interaction improve group performance? : An experiment with the information-cascade paradigm

Hye-rin Kim (Hokkaido University), Wataru Toyokawa, Tatsuya Kameda

The wisdom of the crowds refers to a “group” phenomenon in which aggregated judgments are more accurate than individual judgments. This phenomenon reflects a statistical property where random noises in individual judgments are cancelled out via mechanical aggregation such as group averaging. In reality, however, human group members rely too much on social information contributed by others to make decisions. Social influence leads to a reduction of diversity that can undermine the wisdom of crowds effect. Therefore, it is important to consider whether people can keep a balance between independence and interdependence in decision-making were given social information. We conducted an experiment to investigate how social interaction affects judgmental accuracy using a numerical estimation task, with two conditions: monetary reward to each participant was made contingent on accuracy of the individual’s own judgment or the group judgment aggregated via averaging. Results showed that social interaction improved participants’ judgments only when the payoff was contingent on individual accuracy. When members’ cooperation toward group performance was emphasized (the group-accuracy condition), participant’s judgments became less independent from each other, precluding emergence of the wisdom of crowds.

Does peri-ovulatory increase in facial attractiveness depend on the testing paradigm?

Janek S. Lobmaier (University of Bern), Fabian Probst, Wilhelm K. Klatt, Caroline Allen, S. Craig Roberts, Vít Třebický, Jan Havlíček

Accumulating evidence seems to suggest a peri-ovulatory increase in various aspects of women’s physical attractiveness. However, the adaptational value of such cues to ovulation is highly debated. Moreover, criticism has been voiced concerning the methodological procedures used: most studies have used a two-alternative forced-choice paradigm. Simultaneous presentation of stimuli collected from ovulatory woman and the luteal version of the same woman is an ecologically invalid setting that never occurs in real life. In the present study we assessed whether men find images of women’s faces collected around ovulation more attractive compared to those collected during the luteal phase using an experimental paradigm that more closely resembles a real world situation. Participants rated a series of photographs of women (N=43) which were either taken around ovulation or during the luteal phase. The same participants were invited again after one week to repeat the rating, this time including the respective counterparts of the picture pairs. Photographs were taken under standardized conditions. Ovulation was determined using ovulation test strips and was confirmed by hormone analyses. The ovulatory faces were rated as being significantly more attractive and more feminine than

their luteal counterparts, suggesting that changes in appearance over the cycle might indeed influence attractiveness judgements in a realistic setting. These findings fuel the debate on the validity of the peri-ovulation paradigm.

Environmental harshness and individual variation in life history traits: a cross-sectional study in a French population.

Hugo Mell (INSERM U960), Lou Safra, Yann Algan, Nicolas Baumard, Coralie Chevallier

Life-history (LH) theory studies how organisms facing tradeoffs between competing biological functions have been shaped by natural selection to adaptively allocate their resources. Differences in age specific mortality and fecundity rates mostly explain the diversity in LH traits observed both at the between and within species levels. Moreover, LH traits form coherent strategies which often lie on a fast-slow continuum, the degree of environmental harshness determining which end of the continuum will locally be the most adaptive. This evolutionary framework has recently been successfully used in humans to explain variation in individual LH traits. Yet, the consistency of the broad pattern of individuals living in harsh environments showing an overall fast strategy vs individuals living in more affluent conditions showing an overall slow strategy has rarely been evaluated. Therefore, our study aimed to simultaneously replicate previous findings by testing the link between fast-slow strategies and environmental harshness. We used structural equation modelling (SEM) on cross-sectional data obtained from a survey conducted on a representative sample of the French population (n=1509, age: 16-80 years old, both genders) to assess: (i) the amount of inter-individual variation in somatic (e.g. effort in looking after health) and reproductive (e.g. age at first birth) investments captured by a latent slow-fast continuum, (ii) the amount of variation along the fast-slow continuum explained by the level of environmental harshness experienced during childhood. Overall, our results supported the slow-fast hypothesis and highlighted the relevance of the LH approach to understand variation in reproductive and health related behaviors.

Bidirectional emotional contagion during face-to-face interaction in human

Aiko Murata (Hokkaido University), Hiroshi Nishida, Kei Ohie, Tatsuya Kameda

Emotional contagion is considered as a core of empathy, which is one of building blocks of interpersonal communication. In addition, contagion might have an impact on collective behavior, because it would be a bidirectional process that is evoked through social interaction. Interestingly, some studies showed that mice were influenced by their cagemates' pain behavior bidirectionally, and consequently their pain sensitivities were increased. However, there is little empirical evidence showing that such bidirectional influences are also observed in humans, because previous studies mainly dealt with unidirectional emotional contagion, in which expression of pain in an object entails a reaction of pain in the observer. In this study, we aimed to investigate bidirectional emotional contagion of humans during face-to-face interaction. In the experiment, two participants were given thermal stimuli simultaneously, 12 times in a row, with an increase from moderate to hot temperature. To assess temporal physiological responses, blood volume pulse in their peripheral blood vessels was recorded. The results showed that physiological responses of dyad members were significantly correlated with each other in face-to-face situations. This physiological synchrony was observed only in the

late phase, while not occurring in the early phase. In addition, physiological responses for painful stimuli were increased in the late phase. Thus, two persons can grow similar physiological responses through non-verbal interaction, and this effect seems to induce a change in the sensitivities for painful stimuli.

Is dispersal a good strategy? Sibling competition, dispersal and fitness outcomes.

Aida Nitsch (Institute for Advanced Study in Toulouse), Charlotte Faurie, Virpi Lummaa

Determining the fitness consequences of dispersal and its interplay with sibling interactions is pivotal for understanding the evolution of family living in species such as humans. On the one hand dispersal, could be a strategy to avoid sibling competition, thereby increasing access to competing resources. On the other hand, dispersal could mainly benefit philopatric individuals through a decrease of the intra-familial competition in the natal territory. These two explanations of dispersal imply different fitness outcomes between philopatric and dispersing siblings. Moreover, the intensity of intra-familial competition is likely to influence the fitness outcomes of each strategy. However, studies investigating the fitness outcomes of dispersal according to the intensity of intra-familial competition are lacking. Using a large demographic dataset on humans from preindustrial Finland (n=4,000), we investigated the fitness consequences of dispersal on different indicators of lifetime reproductive success according to sex-specific birth rank. Contrary to our predictions, the negative effect of same-sex elder siblings on reproductive success was similar between philopatric and dispersing individuals for both males and females. Overall, these findings do not support the hypothesis that the costs and benefits of dispersal vary with intra-sex birth rank. This study has important implications for the evolution of family dynamics, dispersal and sibling interactions in humans and in other species.

Analysis of verbal persuasion techniques of people with Dark Triad personality traits

Gabriella Pátkai (University of Pécs), Béla Birkás, Tamás Bereczkei

Dark Triad people are considered manipulative yet in most experimental games their possibilities to make face-to-face interactions are overcontrolled and limited. Social skills are also crucial to successful manipulation for identifying and choosing the exploitable partner and mask real intentions. This probably manifests in both verbal and non-verbal behavior. Our goal was to explore the persuasion techniques used by Dark Triad people in a less limited situation.

Previously measured people with different Dark Triad scores were given detailed information about a four person Public Goods Game, and were told that we have already chosen Player One for the game, who shall pick the other three players according to his/her desires, by watching applicant videos and choosing whoever he/she pleases. So in order to get chosen as a player in the Public Goods Game, it is required to make a short (maximum length of 30 sec) 'self-advertisement video' about themselves, without content restrictions.

These applicant advert videos were shown to participants (also informed about the PGG and filled Dark Triad questionnaire), who evaluated the persons on these videos according to their attractiveness, trustworthiness and perceived „darkness”. Participants

also indicated if they would like to play the PGG with that person, what amount of money they think the person would give as a player and what amount would they give to that person.

Differences were found in evaluations along either the targets' and evaluators' Dark Triad scores.

Are you looking at me?! Manipulated dominance affects eye gaze perception

Fabian Probst (University of Bern), Aline Werren, Janek S. Lobmaier

In many non-human primates direct gaze is a well-documented component of threatening displays. In humans, being looked at can be flattering, but prolonged staring becomes uncomfortable and intimidating. Whether direct gaze is flattering or intimidating may depend on the social dominance of the looker and the person being looked at. In the present study, we investigated whether social dominance affects the sensitivity to direct gaze. Social dominance was manipulated through victory or defeat in a Nintendo® Wii boxing game (Don King Boxing). Participants were 120 men who either played against a computer or a real person. After the boxing competition, participants were asked whether or not briefly presented faces were looking at them. These faces were either making eye contact (0°) or were rotated 2°, 4°, 6°, or 8° to the left and right and showed either a neutral, happy, angry or fearful expression. The results show that winners of the competition (higher feeling of dominance) were significantly more likely to interpret eye-gaze as being directed towards themselves even when the gaze direction was averted. Whether participants played against a computer or a real opponent did not make a difference. We suggest that being looked at may be particularly threatening to individuals of high dominance.

Dying for a drink? Priming with mortality does not affect self-reported desire to drink

Olivia Quinn (University of Liverpool), Minna Lyons, Gillian Pepper, Neil Harrison

Behavioural ecological hypotheses, derived from Life History Theory, predict that the extent to which people are exposed to extrinsic (i.e., uncontrollable) mortality risk should affect their health behaviours. Prior studies have primed participants with extrinsic mortality, but not with other uncontrollable non-fatal events. We investigated the effect of priming extrinsic versus intrinsic (i.e., controllable) fatal and non-fatal events on the desire to drink alcohol. In an on-line experiment, 295 participants were directed either to a control condition (in which no prime was displayed), or to a fake news article designed as; 1) an extrinsic mortality prime, 2) an intrinsic mortality prime, 3) an extrinsic non-death-related prime, or 4) an intrinsic non-death-related prime. After the prime, participants answered questions on perceptions of danger, controllability, and personal responsibility for the events in the prime, their desire to drink alcohol, and recollection of past drinking. Participants reported believing the scenarios presented in the extrinsic primes to be less controllable than those in the intrinsic primes – indicating that the primes manipulated perceptions in the expected directions. Further, participants in the extrinsic mortality condition perceived the world to be more dangerous than those in the other conditions. However, the prime had no effect on self-reported desire for alcohol. Prior studies have found that such primes alter health behaviour, but not related self-reported responses, suggesting their effects may be implicit. To test this, future studies

should include a behavioural measure of alcohol intake post-priming as well as using extrinsic and intrinsic mortality and non-death-related primes.

Love in the time of danger? Women dislike high Dark Triad male facial morphs irrespective of environmental danger

Deepika Ramchandani (University of Liverpool), Minna Lyons

The Dark Triad of personality (i.e., Machiavellianism, narcissism and psychopathy) is a widely researched topic. Previous studies have shown that women dislike the high Dark Triad male facial morphs. However not many studies have investigated women's mate choice for the Dark Triad in different environmental conditions. It is possible that in dangerous environments, women's preference shift towards partners who are scheming, manipulative and aggressive, presumably due to potential for increased protection offered by these men. In an on-line study, we primed women with neutral, non-crime injury, or violent crime newspaper articles, and asked them to choose between high and low morphs in a 2-alternative forced choice task. As in previous studies, women disliked the high Dark Triad faces irrespective of the priming condition. There was a significant main effect with the face type; indicating that women disliked the psychopathy faces less than the other two. This supports the findings from the previous studies as women still do not prefer high Dark Triad faces, even when facing danger. The results are discussed in terms of environmental influences on women's mate choice, and the aversive nature of the Dark Triad men as partners.

Which way to the top? The effects of prestige and dominance within a developmental hierarchy

Daniel Redhead (University of Essex and Durham University), Jamie Tebrani, Steve Lyon

The desire for status and power pervades all cultures. Henrich and Gil-White's (2001) dual model of social hierarchy has stimulated research assessing how prestige and dominance affect an individual's influence within a group. The current research proposes a theoretical expansion of their (2001) model. We argue that, although all individuals have the propensity to utilize prestige and dominance, the socio-cultural environment in which an individual develops impacts upon their disposition towards dominance. The current research uses a novel mixed-methods design in an ethnographic setting, a Romanian orphanage, of which encompasses all stages of childhood development. Study 1 examined how prestige and dominance affected an individual's perceived influence within the group, using translated round-robin prestige and dominance scaled questionnaires (Cheng et al., 2010). A further scale was designed and included to assess whether self-perceived marginalization predicted levels of perceived dominance. In Study 2, social networks were created using name generator questionnaires and participant observation over a period of two months. We found that individuals high in reported prestige and dominance had greater perceived influence and occupied more central positions within the network. Results further indicated that only prestige significantly increased with age. Focally, the current research demonstrates that self-perceived marginalization predicts levels of dominance, as participants reporting higher levels of self-perceived marginalization were targeted by their peers as being high in perceived dominance.

Associations between digit ratio (2D:4D) and religious belief in a sample of British university students

Gareth Richards (Cardiff University)

The 2D:4D ratio (i.e. the relative lengths of the second and fourth digits) is believed to be a biomarker of prenatal sex hormone exposure, with low ratios indicating high testosterone, and high ratios indicating high oestrogen. 2D:4D has been associated with a number of variables of interest to the evolutionary sciences, including physical attractiveness, reproductive success, mate selection preferences, and perceived dominance. In the idea that organised religion might be akin to lek mating observed in certain nonhuman species (i.e. it may allow displaying males to gather for the purpose of attracting large numbers of reproductive females), Manning (2002) proposed that 2D:4D could be negatively correlated with religiosity. In contrast, Voracek (2009) found positive correlations between 2D:4D and paranormal and superstitious beliefs, phenomena which may share similarities with religious beliefs. In order to examine these contrasting accounts, three religiosity questionnaires (the General Religiosity and Spirituality Measure, Revised Religious Fundamentalism Scale, and Religious Commitment Inventory-10) were administered to a sample of 211 university students, and digit ratios were measured directly using Vernier callipers. Support for Voracek was provided as females who claimed religious affiliation had higher digit ratios than those who were agnostic or atheist. However, no significant correlations were observed between 2D:4D and the three questionnaire measures. A possible reason for this is that the population examined generally exhibited low levels of religiosity. For firm conclusions to be drawn, future research should examine 2D:4D and religiosity in samples that are more representative of religious beliefs than are British student populations.

Communication with family and friends across the life course

Anna Rotkirch (Population Research Institute, Väestöliitto), Tamas David-Barrett, Janos Kertesz, Kunal Bhattacharya, Kimmo Kaski

Each stage of the human life course is characterised by a distinctive pattern of social relations. We study how the intensity and importance of the closest social contacts vary across the life course, using a large database of mobile communication from a European country including more than 3 billion calls.

The record of each call contains the time, the duration, and the codes of caller and recipient. Data on gender and age was available for 2.5 million male and 1.8 million female egos. We first determine the most likely social relationship type by relating the age and gender of the caller and recipient to the frequency, length, and direction of calls. Call length and frequency are assumed to indicate emotional closeness and call initiation signals greater emotional or financial need. An age gap of around 25 years between callers represents a family generation.

Results show that communication patterns between parents and children, romantic partners, and friends vary across the six main stages of the adult family life course. Young adulthood is dominated by a gradual shift of call activity from parents to close friends, and then to a romantic partner, the importance of which culminates in the period of early family formation. Middle adulthood shows a high dependence on the

parents of the ego, while at this stage female same-gender friendship also peaks. During post-reproductive adulthood, individuals and especially women balance close social contacts among three generations. The age of grandparenthood is associated with a realignment of close social contacts especially among women, while the old age is dominated by dependence on adult children.

Relationships between Early Maladaptive Schemas, level of couple satisfaction and individual mate potential – an Evolutionary Psychological investigation

Alina Simona Rusu (Babes-Bolyai University), Daciana Dumitrescu

In line with the current trends in Evolutionary Psychology (i.e., focus on the impact of psycho-pathological factors on the individual reproductive potential), we investigated the associations between Early Maladaptive Schemas, the level of couple satisfaction and the mate potential of individuals involved in stable relationships. The research was made on a sample of 182 Romanian participants (174 females and 8 males, average age = 23.99 years). Standard instruments were used to measure the level of Early Maladaptive Schemas (Young Schema Questionnaire; Young & Brown, 2007), the level of couple satisfaction (Dyadic Adjustment Scale; Spanier, 1976), and the individual mate potential, as an indicator of the fitness value (High-K Strategy Scale; Giosan, 2007). Our results indicate that an increased level of Early Maladaptive Schemas predicted a decreased level of couple satisfaction, and that the level of Early Maladaptive Schemas was negatively correlated with the individual mate potential. The investigation points toward the impact of Early Maladaptive Schemas on the fitness value of individuals that have already started to invest their efforts in the process of mate-choice (i.e., by being already involved in stable relationships). The findings are discussed from the functional perspectives of Evolutionary Psychology (i.e., theory of Parental Investment) and Couple Therapy.

Fertility-related detection of fitness-related stimuli: Evidence for the fertility-related rape-avoidance hypothesis

Hannah L. Ryder (University of Leicester), Heather D. Flowe

Previous research demonstrates changes in behaviour which are believed to support the hypothesis that women have evolved a rape-avoidance mechanism, particularly during ovulation when conception risk and thus costs of rape to reproductive fitness are highest. However, whilst menstrual cycle-related behavioural changes have been documented, research lacks focus on the cognitive mechanisms which may underlie these behavioural changes. Furthermore, it is unclear whether the apparent mechanism is rape-specific, or whether women become risk-avoidant more generally during ovulation. This study aimed to examine the cognitive mechanisms which may underlie women's risk-avoidance. Secondly, we aimed to determine whether any fertility-related cognitive mechanisms were specific to stimuli associated with rape, such as threatening males, or generalised to all threats, such as dangerous animals. Thirty hormonal contraceptive (HC) users and 28 regularly and naturally cycling (NC) women participated twice, during days 12-14 (peak fertility) and days 1-3 or 21-23 (low fertility) of their menstrual cycles. Using a dot-probe paradigm, we assessed women's attentional biases via speed of detection of angry versus emotionally neutral male and female faces, and threatening versus neutral animals. There was no effect of cycle day in HC users regardless of stimuli-type, and no effect of fertility-status in NC participants on detection of threatening animals. However,

against expectations, fertile women were significantly faster to detect neutral compared to angry faces regardless of gender, whilst, supporting previous research, nonfertile women were significantly faster to detect angry versus neutral faces. Results may suggest domain specificity in fertility-related attentional biases to fitness-related stimuli.

Attractiveness and time perception: An experiment at a science festival

André Silva (University of Minho), Joana Arantes

Some research has been published on the impact of attractiveness in the human perception of time but most pictures used by the researchers are not standardised. To overcome that, we photographed 132 individuals in Berlin, Germany, during the STATE Experience Science Festival and then had them estimate the duration of either a neutral stimulus or a photograph in an oddball procedure. After the experiment was finished, all participants rated the attractiveness of all presented pictures. Results show that irrespective of participant gender, attractive males were overestimated compared with all other groups. This was the first time such an experiment was conducted outside the laboratory and in a science festival and our results may shed light upon the impact of attractiveness in time perception using standardised imagery in a real-life scenario.

Facial laterality and fluctuating asymmetry: not all asymmetries are created equal

Danielle Sulikowski (Charles Sturt University)

Highly symmetrical faces are frequently perceived as more attractive than highly asymmetrical faces. This has been attributed to fluctuating asymmetry being perceived as a sign of developmental instability. Some studies, however, have failed to find a relationship between facial asymmetry and actual health, casting doubt over this interpretation. Previous investigations, however, have only considered global facial asymmetry. The current paper argues that global facial asymmetry is not, however, likely to be a reliable metric of developmental instability as it is influenced jointly by fluctuating asymmetry and by functional facial laterality. Patterns of facial laterality differ systematically between the sexes, as well as between individuals, and likely serve their own signalling purposes, unrelated to developmental stability. Here, I review a series of findings to support the suggestion that fluctuating asymmetry and functional laterality serve divergent signalling purposes and present preliminary data on the effects of separately manipulating functional laterality and fluctuating asymmetry on judgements of facial attractiveness and trustworthiness.

Local resource competition in modern societies

Antti O. Tanskanen (University of Turku), Mirrka Danielsbacka, Jani Erola

Although several studies have shown that grandparental presence is often associated with improved child well-being, there is also evidence that in some circumstances the effect of grandparental presence is negative. Here we argue that grandparents' negative effect can be explained by the local resource competition between grandparents and grandchildren. The local resource competition model emphasizes that family members who belong to the same household unit and who thus are dependent on the same resources may compete over those resources with each other. The competition should exist, in particular, when the family resources are scarce. However, no previous studies have investigated whether the competition over family resources between grandparents and

grandchildren exists in contemporary Western societies and whether this potential competition influences the grandchild well-being. We use the PISA data from 20 Western countries (n = 64,323 children) to test four hypotheses: H1) Children who live with grandparents in three generational households receive lower levels of parental involvement than children who do not live with grandparents; H2) Grandparental presence is more negatively associated with parental involvement when parental resources are lower than higher; H3) Children living with grandparents in three generational households receive lower educational test scores than children who are not living with grandparents; H4) Grandparental presence is more negatively associated with child outcomes when parental resources are lower than higher. We found support for all these predictions. Thus, the results are in accordance with the local resource competition model.

Altruistic behavior in a context of sexual selection: Do we help attractively - dressed women and handsome men more than others?

Iva Vukojević (University of Zagreb), Iva Sović

There are many research and theories that explain altruism in terms of natural selection, but there are none that are trying to determine a relationship between altruism and sexual selection. This particular research, therefore, is focused on determining relationship between altruism and intraspecific and interspecific competition. This research was conducted under natural conditions with the help of two assistant experimenters (a male and a female) who played the roles of interviewers asking random passers-by to fill out a survey and help them with their student research in two experimental situations depending on their outfit. They wore clothes that emphasized preferences of the opposite sex in terms of theory of evolution and sexual selection (evolutionary attractive) or it did the opposite (evolutionary unattractive). Results showed that, in general, men were more willing to help female helpee opposed to the male helpee, and women were more willing to help male helpee opposed to the female helpee. This matches with the interspecific competition. Also, men helped less when male experimenter was dressed evolutionary attractive which supports the hypothesis of intraspecific competition. Only a few hypothesis were confirmed which leads to the conclusion that more research should be conducted to examine these hypothesis more thoroughly.

The Impact of Kinship on Maternal Mortality

Kai P. Willführ (Max-Planck-Institute for Demographic Research), Johannes Johow, Eckart Voland

Objectives: Demographers define maternal death as the death of a woman within 42 days of termination of pregnancy not due to accidental or incidental causes. Many risk factors have been identified, but little attention has been paid to the roles of social and family context. This study investigates how the paternal and maternal kinship composition affects maternal mortality.

Data & Methods: We studied the life course of 3,990 women born to families between 1720 and 1810 in the rural pre-industrial Krummhörn region in East-Frisia, Germany. We used event history analysis to study the impact of siblings, parents, maternal and paternal grandparents, and aunts and uncles and their families on female adult mortality. We further considered the distances of places of residence and the life status of the

relatives (e.g. age and marriage status), and applied fixed-effect models to compare sisters of the same family.

Results & Conclusion: Results indicate that adult sisters increased the risk of female adult mortality and maternal death. The presence of maternal grandmothers had an opposite effect. The impacts are particularly strong when the sisters or the mother lived in the same village. Further, life status of the relatives appears to be important (e.g. married sisters are less harmful than unmarried). These findings suggest that female siblings competed for reproductive success and that social and family context matters for maternal mortality.

Interpersonal passion as an adaptive device in high relationally mobile social environments.

Junko Yamada (Hokkaido University), Mie Kito, Masaki Yuki

Why do humans feel passion? While it is known that passion is an emotion of intense longing for union with another person, the adaptive function of passion is not clear. We argue that passion is a psychological device which drives an individual to restrict one's access to alternative mates; this 'costly signalling' of commitment to a specific target should increase reproductive success. Costly signalling, however, will be particularly adaptive in high relational mobility societies (i.e., societies with greater freedom to select and replace relationships), where people are frequently exposed to the risk of mate poaching. In these societies, voluntarily restricting one's access to alternative mates, during relationship seeking situations, should make an individual more likely to be selected by a potential partner. Furthermore, when the actor is already in a relationship, restricting access to alternative mates should increase the likelihood retaining a current partner. To test these predictions, we conducted a cross-societal study between the United States (high relational mobility) and Japan (low relational mobility). In line with our predictions, Americans reported stronger passion towards their romantic partners than Japanese, and the results of mediation analysis, relational mobility in respondents' surrounding social ecology was a significant predictor of such cultural difference. Moreover, path analyses indicated that high relational mobility was associated with greater commitment display behaviors, via feelings of passion. We discuss the evolution of passion and the importance of taking socio-ecological factors into consideration when addressing adaptive interpersonal behaviors.

Measuring urban-rural variation in cooperative tendency with a lost letter experiment.

Elena Zvirner (University College London)

At present, a growing body of evidence shows that city-life negatively affects mental wellbeing by increasing the risk of high anxiety levels and mood disorders. Moreover, city-life is associated with higher stress levels, which may reduce the propensity to trust others and, consequently, inhibit cooperation. This is supported by field studies in which city-dwellers are reportedly less cooperative than their rural-dwelling counterparts, suggesting important impacts of urbanicity as an environmental factor on cooperative behavior. With over half of the world population living in cities, it is of primary importance to understand how city-life may influence our behaviour. To this end, I used a lost letter experiment with "direct" and "indirect" help requests (i.e. letters left on

POSTERS: SESSION 2 (by first author's last name)

A cross cultural examination of the Dark Triad and parasitic romantic relationships

Sue Aitken (Liverpool Hope University), Stacy Omotayo

The Dark Triad is a much studied personality constellation consisting of Psychopathy, Machiavellianism and Narcissism. While extensively researched in the Western World, few studies have assessed the Dark Triad in a non-Western population suggesting this is a useful area for exploration (Jonason Li, Webster, & Schmitt, 2009). The elements of the Dark Triad share common themes, such as lack of empathy, exploitativeness and self-promotion. Machiavellianism has been defined as the willingness to manipulate others with a utilitarian morality that see others merely as sources of self-gain and success (Christie & Geis, 1970). Similarly those high in psychopathy are primarily motivated by self-interest and seek to acquire resources for themselves (Meyers, 2014). This study had two aims: firstly to measure and compare the Dark Triad in a Nigerian and a UK sample; and secondly to look at the relationship between Dark Triad elements and if/how they have benefitted from a romantic relationship. Participants will complete the short form of the Dark Triad scale (Paulhus & Jones, 2014) and answer questions about if, when and how they have benefited from a romantic relationship. Data collection will take place between December 2015 and February 2016. It is expected that those high on the Dark Triad will demonstrate a more parasitic relationship style.

Are cooperative men showing off? Contributions to a public good are enhanced under sexual competition

Tognetti Arnaud (Institute for Advanced Study in Toulouse), Dubois, D, Willinger, M, Faurie, C

Why humans cooperate in large groups and between non-kin remains a puzzle for researchers across the natural and social sciences. Despite a huge amount of theoretical and experimental investigations of cooperation, the potential role of sexual selection has been overlooked. Yet, competition for access to mates could induce positive selection for cooperation. Using controlled laboratory experiments, we analyse whether and how the sex composition of a social environment, testosterone level, and relationship status, affect contributions to a public good, notably in the context of sexual competition. The results show that variation in sex composition alters the amount of money that men (but not women) contribute to a public good. Notably, in line with the competitive helping hypothesis, the presence of women induces competition between men, leading to larger contributions by men. Furthermore, we found that this tendency was exacerbated in single men compared to men in a couple. However, no link between basal testosterone level and cooperativeness was found. We argue that men adopt cooperative behaviours as a signalling strategy in the context of mate choice and hence that cooperation is partly sexually selected. Our findings highlight the need to consider sexual selection as an additional force acting on cooperation.

What's most relevant to someone's concern about diseases, their early-life experience of illness or current perception of diseases?

Rattanawan Arunthunya (University of Warwick), Corey Fincher

Individuals possess psychological mechanisms that protect the body from the potential presence of pathogens. Disgust stimulates disease-avoidance mechanisms. To measure pathogen disgust sensitivity (PD), several versions of a disgust scale have been developed, as well as the perceived vulnerability of disease (PVD) scale. PVD was divided into two subscales, perceived infectability (PI) and germ aversion (GA) as their purposes of measurement were different. Many studies in the field have used disgust sensitivity and PVD to account for individual differences in various aspects. Nonetheless, no existing papers reveal an indicator for these dependent variables. This paper attempted to examine the potential determinants of these variables. American and Indian participants were recruited to conduct an online survey measuring PVD, disgust sensitivity, as well as potential indicators of these variables. Four focusing factors (childhood environment, early experience of diseases, current wealth and recent experience of diseases) were initially constructed by a principle-components factor analysis. Additional factors were then investigated with the four major factors by the seemingly unrelated regression to finalise the models. The findings suggest that perceived infectability can be explained by the childhood environment, the experience of disease during childhood and at present time. On the other hand, germ aversion and pathogen disgust are mainly determined by the degree of information receiving. Three models were constructed from these results.

Partner Choice versus Punishment in Human Prisoner's Dilemmas

Pat Barclay (University of Guelph), Nichola Raihani

Two factors that promote cooperation are partner choice and punishment of defectors, but which option do people actually prefer to use? Punishment is predicted to be more common when organisms cannot escape bad partners, whereas partner choice is useful when one can switch to a better partner. Here we use a modified iterated Prisoner's Dilemma to examine people's cooperation and punishment when partner choice was possible and when it was not. The results show that cooperation was higher when people could leave bad partners versus when they could not. When they could not switch partners, people preferred to actively punish defectors rather than withdraw. When they could switch, punishment and switching were equally preferred. Contrary to our predictions, punishment was higher when switching was possible, possibly because cooperators could then desert the defector they had just punished. Punishment did not increase defectors' subsequent cooperation. Our results support the importance of partner choice in promoting human cooperation and in changing the prevalence of punishment.

Parents' birth intervals are not associated with life history characteristics

Venla Berg (Population Research Institute, Väestöliitto), Anna Rotkirch

Short birth intervals between children have been associated with increased risk of divorce and reduced longevity in parents. These associations can be indicative of a fast life history: early and fast reproduction in response to harsh environments with low life expectancy. If indicative of life history, birth intervals are expected to affect one's reproductive behaviour: closely spaced siblings could serve as clues of environmental harshness in childhood and steer towards a faster strategy. With a representative, register-based dataset of Finns (born in 1955 and 1960) and one (N = 5322 – 8862) or two

siblings ($N = 3381-13,181$), we show that birth intervals of childhood family are not associated with person's life history characteristics, namely, age at first birth ($b = -0.00$, $p = .091$ for parents with one sibling in their childhood family; $b = -0.00$, $p = .156$, $b = -0.00$, $p = .724$ for the first and second birth interval, respectively, for parents with two siblings in their childhood family), number of children ($b = -0.00$, $p = .262$; $b = 0.00$, $p = .781$; -0.00 , $p = .823$) or the probability to become a parent ($OR = 1.00$, $p = .519$; $OR = 1.00$, $p = .191$; $OR = 1.00$, $p = .326$), nor with the first birth interval of their own children ($b = 0.00$, $p = .888$; $b = -0.00$, $p = .937$; $b = -0.00$, $p = .962$). It seems that childhood birth intervals do not serve as markers of reproductive strategy, but replicative studies are needed.

Parenthood and in-law conflicts in contemporary Finland

Mirreka Danielsbacka (Population Research Institute, Väestöliitto), Antti O. Tanskanen, Anna Rotkirch

Objectives: As inclusive fitness theory predicts, relations between kin differ from relations between non-kin. In-laws are not genetically related, yet often treated more like kin than non-kin. Hughes (1988) argued that in-laws become “inversely” genetically related to each other through common descendants. Thus one may predict the advent of children to be the key element shaping relations between in-laws. To date, only few studies have investigated how parenthood is related to the child/parent or child/parent-in-law relationship.

Methods: Using a nationally representative survey of younger adults from contemporary Finland ($n = 1,202$; mean year of birth = 1975) gathered in 2012, we compare couples with and without children and ask how parenthood is associated with the likelihood of conflicts between women's and men's own parents and in-laws, separating respondents by both kin lineage and gender. As a method we use logistic regression analyses and control for several confounding variables.

Results: Results show that both male and female spouses reported more conflicts with their own parents than with their in-laws. Having children was associated with increased likelihood of conflicts with parents-in-law, but not with own parents.

Conclusions: Results confirmed our hypothesis, which was based on inclusive fitness theory as extended to in-laws and predicted that parenthood would be differently associated with conflicts in relation to own parents compared to in-laws. Our results indicate that having children makes both women's and men's relationships towards parents-in-law more similar to those towards genetic kin.

Conservatism versus flexibly relinquishing and building on witnessed behaviours to improve efficiency in chimpanzees (*Pan troglodytes*) and children (*Homo sapiens*)

Sarah J. Davis (University of St Andrews and The University of Texas), Cristine H. Legare, Jennifer M. Clegg, Rachel E. Watson-Jones, Andrew Whiten

Evidence for culture in non-human species continues to grow, yet there are few candidate examples of cumulative culture outside of humans' distinctively complex achievements. Prerequisites for cumulative culture include not only the ability to build on established behaviours but also to relinquish old solutions and flexibly switch to more

productive or efficient ones. To better understand the emergence of behavioural flexibility in the developing child, as well as in hominin evolutionary history, we compared the ability of children aged 3-5 years and adult chimpanzees to relinquish a practiced solution to a problem in favour of an observed more efficient strategy. Preliminary data analysis indicates that flexibility of behaviour fluctuates in the developing child, with younger children showing greater ability to upgrade to more efficient solutions than both older children and chimpanzees ($H(3) = 11.02, p < .01$). These results, with children converging on, rather than diverging from, chimpanzee results may surprise many. How children and chimpanzees converge on solutions is investigated through analysis of how they use social information; for example, through tendencies to faithfully replicate observed actions versus exploratory replication of witnessed results. Additionally, the use of irrelevant behavioural elements, as well as reversions to old solutions, is developmentally tracked and compared across species. Findings have implications for the nature of cultural transmission in the two species.

A new experimental approach probes cultural innovation and transmission in young children

Lewis Dean (University of St Andrews), Emily Burdett, Amanda Lucas, Daniel van Der Post, Andrew Whiten

Human culture is uniquely complex, with cumulative increases in technology occurring over generations. This results in products too complicated for any one individual to produce alone. Researchers interested in the evolution and development of cumulative culture have attempted to replicate cultural ratcheting 'in vitro' by examining how groups of animals make small-scale improvements to their behaviour to gain better rewards. This experiment expands that methodology, applying it to a rich cultural world, more reminiscent of the complex cultural environment of humans. The 'small worlds' apparatus offers four different exits, at four increasingly difficult levels, which can be manipulated with a number of different tools. To test cumulative culture over 'generations' a replacement transmission chain was run with four-five year old children ($n=66$). One child, of a group of three, was replaced every five minutes until an entirely new group of children was present, with each chain run for 20 minutes. While there is no evidence for cumulative improvements along the chains, there was success at more complex levels in some chains. There is also evidence of strong cultural differences between groups (Mann-Whitney, $p= 0.0054$), suggesting this novel and complex approach may enable us to explore children's social learning 'in the wild'.

Shared ambiguity resolution strategies promote mutual fitness of language and perceptual systems

Magda L. Dumitru (METU Ankara), Gitte Joergensen, Silvia Harris, Susan Harvey

Three studies explored the hypothesis that noisy perceptual signals foster variable mappings to language expressions, thus promoting the biological fitness of the language system. In particular we show that, whereas unambiguous signals (i.e., stimuli moving in the same direction) generate single mappings with language expressions (i.e., conjunction and disjunction expressions) irrespective of evaluation mode, noisy signals (i.e., stationary stimuli) generate single mappings when evaluated together with unambiguous signals and convergent mappings when evaluated separately. These results demonstrate that, just as

perceptual noise prompts perceivers to find plausible mappings with corresponding percepts depending on context (e.g., by applying the contrast effect), so is visual noise prompting language users to find reliable mappings with language expressions (one per context type) by engaging similar adaptive mechanisms. Our results afford a rare glimpse into real-time interactions between individual adaptability and system fitness, suggesting that cognition and perception could have evolved in synergy such that imperfections in one system (i.e., audition) improve individuals' adaptability and overall fitness in another system (i.e., language). The recycling of adaptive mechanisms across systems invites the conclusion that a common strategy (e.g., the need for coherence) oversees these adaptive mechanisms.

Tattooed men: Healthy bad boys or good looking competitors?

Andrzej Galbarczyk (Jagiellonian University), Anna Ziomkiewicz

Tattoos have a long history and are well-known from various cultures. It has been hypothesized that such decorations are an honest signal of genetic and phenotypic quality. In our research we wanted to investigate how the presence of a tattoo influences perception of real males' photos. We photographed nine shirtless men without tattoos from the waist up. We digitally modified these pictures by adding a black arm tattoo with an abstract, neutral design. We asked heterosexual women and men to rate a randomly selected version of each photo in several categories. Data were collected from 2463 women and 234 men from Poland by an online survey. Women rated modified versions of the pictures as healthier but not more or less attractive than the original. Inversely, men rated modified version of pictures as more attractive but not more or less healthy than the original. Both men and women rated pictures of men with a tattoo as more masculine, dominant and aggressive. Our results identify two important sexual selection mechanisms that may support tattooing in humans. First, women perceive tattoos as a signal of good health, masculinity, and dominance. They may thus favour tattooed men as more valuable partners with potentially better health and higher social rank. Second, men perceive tattoos as a signal of attractiveness, masculinity and dominance. Therefore, they may assess those traits as qualities of stronger and more successful same-sex rival.

It's a man's world; mate guarding and the evolution of patriarchy

Rachel Grant (Hartpury College), Tamara Montrose

During human evolution the prevention of cuckoldry has been an adaptive problem for the human male, solved in many other species by intensely guarding females during fertile periods. Signs of estrus in human females are much more subtle than in many other species meaning that there is less certainty of the exact timing of the fertile period. This necessitates extended mate guarding which potentially reduces male fitness due to the loss of extra-pair fertilization opportunities and other costs, such as reduction in the time spent acquiring status and resources. Patriarchy is the control of female sexuality and fertility by males and has existed for thousands of years. We examine the manifestations of patriarchy as a unique form of mate guarding which is able to function even in the absence of males. We explore historical and contemporary patriarchal practices such as rape, foot-binding, honour-killing and female genital mutilation and argue that males use patriarchy to increase the costs associated with female extra-pair copulation to increase paternity certainty. At the same time patriarchy functions to

enforce in-pair childbearing by discouraging contraception and abortion. We propose that this form of control of females evolved to avoid an evolutionary trade-off between the benefits of monogamy and those of promiscuity in human males. We also discuss patriarchy in the context of niche construction and propose that patriarchy is a cultural niche which has functioned to maximize individual males' fitness. When viewed from an evolutionary perspective, the persistence of patriarchy into the 21st century is unsurprising.

Women's age difference with their husbands and fitness in a polygynous community in Ghana

M.P.J. Hafkamp (Leyden Academy on Vitality and Ageing), D. Van Bodegom

Across cultures, women form couples with older men. The ubiquity of this age difference suggests that its causative traits might have been shaped by natural selection. Evidence regarding the fitness correlates of partners' age difference has so far been lacking in observations in polygynous populations. To address this issue, the relationship between a woman's age difference with her husband and two components of evolutionary fitness was measured in a polygynous population in Northeast Ghana. Firstly, it is shown in an analysis of both self-reported and observed fertility that women who are 7.7 to 8.2 years younger than their husbands have a maximal number of children. Secondly, offspring survival is shown to be independent of a woman's age difference with her husband. Consistent with similar findings in other populations, these results suggest that natural selection can promote traits such as age-related mating preferences by acting through partners' age difference.

Gossip and Trust in Online Dating

Lara Hallam (University of Antwerp), Charlotte J.S. De Backer, Sara Pabian, Michel Walrave

While online dating has become increasingly popular, the risks of finding romance through this medium remain high. Potential partners' reliability is harder to verify in this cue-poorer Internet-based environment. In this study we investigate how gossip may resolve issues related to trust and reliability of potential partners online. A 2 (male vs. female) x 2 (gossip tag vs. control) survey-experiment amongst a sample of single heterosexuals (N=218) analyzed the effect of adding positive gossip to online dating profiles. Repeated Measures ANOVA's investigated within-subject differences in scores for perceived trustworthiness, and willingness to go out on a date, controlling for general levels of trust (Yamagishi & Yamagishi, XX). Results showed that high trusting respondents rated potential candidates more trustworthy compared to low general trusting respondents. Also, all respondents rated the potential candidate with the positive gossip tag as more trustworthy compared to the candidate with no gossip. Furthermore, only male participants scoring low on general trust appear to be more likely to go out on a date with a woman whose online dating profile had a positive gossip tag. Males who are high general trustors, and all female participants were less likely to date the candidate with the positive gossip tag, compared to the candidate without the tag. We conclude that positive gossip can increase an online dater's perceived trustworthiness, yet the willingness to actually date someone doesn't merely depend on how much you perceive this person as trustworthy because other factors are also at play.

Innovative and flexible tool-based solutions in chimpanzees in response to a changing foraging task

R. A. Harrison (University of St Andrews), E. J. C. van Leeuwen, A. Whiten

Innovation, behavioural flexibility and social learning are key factors facilitating cumulative culture. Recent studies (eg. Lehner, Burkart, & van Schaik, 2011) suggest great apes may possess a greater capacity for behavioural flexibility than previously indicated (eg. Marshall-Pescini & Whiten, 2008). Chimpanzees at the Chimfunshi Wildlife Orphanage, Zambia were provided a novel foraging task (a tube partially filled with juice) and a selection of tool materials. After 10 hours, a narrower version of the tube was presented, restricting available solutions. After a further 20 hours, frequently used tool materials were removed, again restricting the solutions available. Across 40 hours of testing, 6379 individual attempts were made. Preliminary results indicate that chimpanzees flexibly altered their choice of tool material in response to the change in tube width (use of hands and cloth decreased, while use of sticks increased) in a manner which aligned with success rates achieved using each tool material. Following observation of another individual attempting the task, chimpanzees were likely to match either the technique or tool material observed. A subset of chimpanzees used innovative composite tool techniques, and one individual modified these techniques when preferred materials were removed. These findings indicate that, under certain conditions, chimpanzees may be capable of the innovation and behavioural flexibility necessary to support the evolution of cumulative culture.

The depth of social perception: An exploration into social trait judgements in 2D and 3D faces

Louise Heron (University of Stirling), Peter Hancock, Anthony Little

Social trait judgements, particularly facial attractiveness, have received extensive attention over the years. However, this research has focussed almost exclusively on 2-dimensional (2D) faces. Further, in the few studies that have utilised 3-dimensional (3D) faces, other social trait judgements such as trustworthiness, dominance and distinctiveness have been largely omitted. Therefore, this study investigated whether a broader range of social trait judgements differ between 2D and 3D presentation formats.

Methods: Participants rated 2D and 3D male and female faces, in counterbalanced order, on various social traits using a 7-point Likert scale. 2D images were static, frontal photographs of faces; 3D faces were freely rotatable 360° by the viewer.

Results: Focusing on attractiveness, consistent with previous research, a positive correlation occurred between average attractiveness ratings in 2D and 3D faces. Furthermore, a 2 x 2 mixed factor ANOVA, conducted on mean attractiveness ratings grouped by participant gender, highlighted a main effect of type of view, with 3D faces receiving higher attractiveness ratings. No main effect of gender or significant interaction between gender and type of view was found. Results for other social trait judgements will also be discussed.

Conclusions: Our preliminary findings highlight both similarities and differences in employing more ecologically valid face stimuli in social trait judgement research.

Can the mind impact physical fitness? Empirical data on mental "fitness factors" influencing physical fitness in an evolutionary fitness approach.

Thomas Hirschmann (University of Mannheim)

This research aims to present data from an analysis into mental "fitness factors" that are able to influence performance in a physical fitness program that is aligned with evolutionary principles. Data stems from regular participants of a fitness approach called "crossfit" which is based on evolutionary fitness principles (Platek et. al., 2011). The research is testing the hypothesis that there are certain mental fitness factors that are able to predict the performance of crossfit participants independent from their physical strength and endurance. Further, we aim to explore the relationship between mental and physical fitness factors and will look into potential interdependent body-mind-interactions. As an outlook, the research will try to describe a behavioural program that might be able to positively influence both mental as well as physical fitness in an evolutionary sense.

What Flowers Do We Like? The Influence of Shape and Color on the Rating of Flower Beauty

Martin Hůla (Charles University), Jaroslav Flegr

Knowing which flowers are more attractive to humans than others is important for many areas of people-plant interaction research. The perceived beauty of flowers might for example influence the psychological benefits they provide to humans. It is thus reasonable to ask if people find some flowers more beautiful than others. Although there are some theoretical works concerning preferred flower traits, empirical evidence is largely missing. In this study, we used an online survey in which residents of the Czech Republic ($n = 2013$) rated the perceived beauty of 52 flower stimuli of diverse shapes and colors. Colored flowers were preferred over their uncolored versions. When controlling for flower shape, we found an unequal preference for different flower colors, blue being the most and yellow the least preferred. In the overall assessment of beauty, shape was more important than color. Prototypical flowers, i.e., radially symmetrical flowers with low complexity, were rated as the most beautiful. We also found a positive effect of sharp flower contours and blue color on the overall rating of flower beauty.

Angry eyes decrease giving behavior

Wendy Iredale (Canterbury Christ Church University)

Being seen to help others may explain why people give to charity in the absence of kin or reciprocal benefits (Hardy & Van Vugt, 2006; Roberts, 1998). By making people feel as though they are being watched, costly signalling theory can aid charities increase donations (Zahavi, 1977). Photographs of eyes presented on computer screens have been shown to increase generosity (Burnham & Hare, 2007). However, very little has been done to explore the characteristics of these eyes, and yet we know that gender (Iredale et al. 2007) and emotion (Webb & Wong, 2014) both play a role in initiating altruistic acts. To test whether the emotion (angry vs. neutral) and gender (male vs. female) of eyes affects charity donations, 111 participants played economic games in which they could earn money (up to £3). On completion of these games, a computer screen presented participants with a photograph of either angry eyes (male or female), neutral eyes (male

or female) or none, and asked participants if they would like to donate a percentage of their earnings to an anonymous charity. People gave significantly more to charity when eyes were present, and donations were significantly higher when the eyes were neutral compared with angry. Gender of the eyes did not significantly affect charity donations nor was there an interaction between emotion and gender. The findings suggest that the emotional expression of eyes presented on screen can influence charity donations.

Male infants, risk, and postnatal depression: Evidence supporting the Trivers-Willard hypothesis in a contemporary low-fertility context

Sarah E. Johns (University of Kent), Sarah Myers

Maternal care is obligate in mammals to ensure offspring survivability; however levels of investment are flexible dependent on resource availability. Parental investment theory predicts a mother should cease investing in an individual offspring when the benefits of the investment to her inclusive fitness are outweighed by the costs. The Trivers-Willard hypothesis predicts that a son of high quality will out-reproduce a daughter of comparable quality, while a daughter will have higher reproductive success than a son if both are of low quality. Postnatal depression is suggested by some evolutionary theorists to reflect active withdrawal of maternal investment in humans under conditions where continued investment is too costly. If this is the case then it should be expected to 1) conform to Trivers-Willard predictions and be both more common in association with sons than daughters, and 2) be more common in circumstances in which investment in sons is more costly. We test these hypotheses using data collected from a survey of women's complete reproductive histories which utilised retrospective measures of postnatal depression. Multilevel modelling showed that women were more likely to suffer postnatal depression after the births of sons than after the births of daughters, when controlling for other postnatal depression risk factors. Having sons was also found to elevate postnatal depression risk when mothers experienced low social support or complicated births. This is a novel and important finding of which healthcare professionals should be made aware.

Coloration in different areas of facial skin is a cue to health: The role of cheek redness and periorbital luminance in health perception

Alex Jones (Gettysburg College), Aurelie Porcheron, Jennifer Sweda, Frederique Morizot, Richard Russell

Looking healthy is a socially desirable trait, and our faces are a primary signaling system for our health status. Though research has documented that skin colouration across the whole of the face influences perceived health, skin conditions that cause dissatisfaction with appearance and affect health ratings are often specific to particular facial regions. We investigated whether colour variation across facial skin affects perceived health. In Study 1, we examined the CIEL*a*b* colour differences between faces perceived as healthy and unhealthy, and defined three areas - the forehead, periorbital (under eyes) areas, and the cheeks. Higher luminance in the periorbital areas and redness in the cheeks predicted perceived health, as did skin yellowness across all regions. In study 2, the increased luminance and redness caused faces to be perceived as healthier, but only if the colouration was in the periorbital and cheek areas, respectively. In a final study, manipulating the colouration of each area separately revealed that while periorbital

luminance and cheek redness equally increased perceived health, lower periorbital luminance more negatively impacts perceived health than greener cheeks. These findings show that perceiving health from the face may depend on the variation of colour across facial skin.

Perspective Taking in Impression Management: The Cost of Revealing Intentions Behind Altruistic Choice

Mia Karabegović (Central European University), Christophe Heintz

Others' choices can be interpreted as resulting from different intentions depending on the surrounding context. In particular, seeing someone perform a generous action can be interpreted as either resulting from an intention to benefit others, or an intention to impress them. Depending on the information available to observers, the willingness to impress can thus be self-defeating: in this study, we investigate such situations. We designed an experiment in which altruistic choices could, depending on the condition, be interpreted by potential partners as revealing either generosity or strategic thinking. In our paradigm, participants could change the transfer they had previously made after being told that it would be observed by a potential partner, with whom they could obtain further gain. In the first condition, only their previous transfer was visible, but not their decision (and option) of changing. In the second condition, both the transfer and the decision to change was observable, which made the underlying strategic intent more salient. Our results show that people were willing to increase their contributions in order to attract potential partners, but the strategies they employed were different. While there was a trend towards more change when the decision to change was unknown, those who changed in the second condition increased their contributions by a significantly larger margin. We analyze the inferences people make about how their choices will be interpreted, showing that impression management involves mindreading with second-order metarepresentations, and is adapted to an environment of strategically vigilant partners for cooperation.

Value of 2D:4D is stable across the menstrual cycle

Magdalena Klimek (Jagiellonian University), Urszula M. Marcinkowska, Grazyna Jasienska

Digit ratio (2D:4D) is used as a marker of prenatal hormone exposure and, in a consequence, as a predictor of many characteristics of individuals during their lifespan. A previous study suggested that values of 2D:4D vary across menstrual cycle due to changes in hydration of soft tissue at the top of the fingers, and questioned a reliability of a single measurement of 2D:4D in cycling women. We test potential changes in 2D:4D value across a menstrual cycle in a larger (than previously studied) group of women, among whom phases of the menstrual cycle were determined by ovulation tests and a reverse counting days method.

The study participants were 32 women aged 22-37, from the Mogielica Human Ecology Study Site located in southern Poland, who were not pregnant, breastfeeding or taking hormonal contraceptives for at least three months before the participation. Right and left hand scans were taken three times for each woman during the menstrual cycle (in the follicular phase, around-ovulation and in the luteal phase).

2D:4D values did not differ among the three phases of the menstrual cycle neither when calculated for right hand ($P=0,26$), left hand ($P=0,46$), nor for a mean value of both hands ($P=0,51$). We documented that 2D:4D is independent of the phase of menstrual cycle. These findings suggest that among naturally cycling women value of 2D:4D can be obtained from a single measurement taken during any day of a menstrual cycle.

The Face of Power

Klatt, Wilhelm K. (University of Bern), von Weissenfluh, Francine, Janek S. Lobmaier

Objective: In humans and other animals, open, expansive postures (compared to contracted postures) are evolutionary developed expressions of power and have been shown to cause neuroendocrine and behavioral changes (Carney, Cuddy, & Yap, 2010). In the present study we aimed to investigate whether power postures have a bearing on the participant's facial appearance and whether others are able to distinguish faces after "high power posing" from faces after "low power posing".

Methods: 16 models were photographed 4-5 minutes after having adopted high and low power postures. Two different high power and two different low power postures were held for 2 minutes each. Power-posing sessions were performed on two consecutive days. High and low power photographs of each model were paired and an independent sample of 100 participants were asked to pick the more dominant and the more likeable face of each pair.

Results: Photographs that were taken after adopting high power postures were chosen significantly more often as being more dominant looking. There was no preference when asked to choose the more likeable photograph (chance level). A further independent sample rated each photograph for head tilt, making it unlikely that dominance ratings were caused merely by the posture of the head. Consistently, facial width-to-height ratio did not differ between faces after high and low power posing.

Conclusions: Postures associated with high power affect facial appearance, leading to a more dominant looking face. This finding may have implications for everyday life, for instance when a dominant appearance is needed.

Effects of male testosterone and cortisol reactivity on self- and observer-rated behavioural states in a competitive mating context

Tobias Kordsmeyer (University of Goettingen), Lars Penke

The steroid hormone testosterone (T) is assumed to play a key role in regulating human behaviour along a competitive-nurturing dimension, especially in mating contexts for men. Increased T levels have been found after exposure to an attractive female, and in response to intrasexual competition. Furthermore, high T has been shown to facilitate courtship behaviours. Buffering effects of cortisol (C) on T have also been found. However, how exactly T-reactivity, also in interaction with C, relates to behavioural state changes is still unclear.

In a preregistered study, we aimed at inducing an increase in T in men ($N=125$, $\text{Mage}=24.1\pm 2.2$ years, 47.0% single) in response to exposure to a potential mate (attractive female confederate) while participating in dyadic intrasexual competitions (e.g., arm wrestling, competitive table pinball). We investigated changes in self- and video-

based observer-rated social dominance and nurturance, as captured by the Interpersonal Circumplex Model, and their relationship to salivary hormonal levels and reactivity (T&C), including their interaction.

Results suggest increases in self-rated extraversion and arrogance, and decreases in ingenuousness, the latter two moderated by T-reactivity and its interaction with baseline-C. Observer-rated dominance-assuredness and arrogance increased, while aloofness-introversion decreased, however not moderated by T or C.

These findings indicate that male behavioural changes in response to a competitive mating context are more along the dominance and less along the nurturance axis of the interpersonal circumplex. Reasons for why T-reactivity and its interaction with basal C were only associated with self- but not observer-reports of these changes will be discussed.

Machiavellians' success is based on categorisation of inter-individual commonalities

Luca Kozma (University of Pécs), Ferenc Kocsor, Tamas Bereczkei

Objectives: Machiavellian intelligence hypothesis states that high Machs' skilful manipulation of others conferred significant evolutionary advantage. Given that Machiavellians perform poorly in mindreading and emotional intelligence tests, the question arises: what skills and mechanisms did natural selection affect that make Machiavellians successful manipulators? We propose that one of them is categorisation. Using situational information and previous knowledge in social judgments helps Machiavellians choose victims to manipulate.

Methods: Forty pictures of 16 men were shown to 100 people. They displayed four facial expressions (taken from Ekman's FACS) and were paired with either positive or negative social descriptions. The expressions had been previously labelled as trustworthy, untrustworthy or neutral. In the first part of the experiment eight picture/description pairs were shown and participants learned the expressions and their accompanying descriptions. In the second part eight novel faces with the previously presented expressions were shown. Participants judged how trustworthy each face was.

Results: While judging novel faces, Machiavellians relied more on the valence of the expressions (trustworthy, untrustworthy) than the descriptions of the opposite valence. In contrast, when they had to judge novel persons with neutral expression, Machiavellians were more successful than others in applying social information formerly associated with that expression.

Conclusions: Machiavellians are skilled at specific learning mechanisms based on categorization and generalization. They use that kind of information which predicts other's behavior with the highest probability. Instead of making specific predictions on others' mental states, they are able to extract information from inter-individual commonalities.

Viewers extract the mean from images of the same person: A route to face learning

Robin Kramer (University of York), Kay Ritchie, Mike Burton

Research on ensemble encoding has found that viewers extract summary information from sets of similar items. When shown a set of four faces of different people, viewers merge identity information from the exemplars into a representation of the set average. Here, we presented sets containing unconstrained images of the same identity. In response to a subsequent probe, viewers recognised the exemplars accurately. However, they also reported having seen a merged average of these images. Importantly, viewers reported seeing the matching average of the set (the average of the four presented images) more often than a nonmatching average (an average of four other images of the same identity). These results were consistent for both simultaneous and sequential presentation of the sets. Our findings support previous research suggesting that viewers form representations of both the exemplars and the set average. Given the unconstrained nature of the photographs, we also provide further evidence that the average representation is invariant to several high-level characteristics. Overall, our results suggest a possible evolved mechanism for learning new faces through the extraction of an identity-specific average representation.

Firstborns are overrepresented among biology students: The influence of family constellation on education considering age-gap and gender of siblings

Radim Kuba (Charles University and National Institute of Mental Health, Czech Republic), Jaroslav Flegr, Jan Havlicek

Introduction. Birth order was shown to affect various psychological characteristics, ranging from personality to sexual behaviour. Several previous studies also suggested firstborn advantage in educational achievements. However, others did not find such effect. This might be due to neglecting possibly modulating factors such as gender and age-gap among siblings. Thus, while taking into account these modulating factors, in our study we focused on the effect of birth order on educational achievements.

Methods. We collected birth order data (including gender and age-gap of respondents and their siblings) from two cohorts of Charles University biology students (cohort 1: students from 1990-1995, N=271; cohort 2: students from 2011-2015, N=1355). Proportions of firstborns in both cohorts were compared with population data obtained from the Czech Statistical Office. The gender, age gap between siblings and family size were controlled.

Results. In both cohorts, we found significantly higher proportions of firstborns when compared to the population. We also observed a decrease in representation of firstborns in the second cohort set. Further, closer age-gap between siblings increased the proportion of firstborns, although there are some gender differences. This effect is stronger among women.

Conclusion. Our results support previous findings on the firstborn advantage in educational achievements. They also highlight the importance to control for gender and age-gap among siblings. We suggest replication of our results and further testing of the age-gap effects for example in personal traits data.

Do personality affect the result of speed-dating?

Radka Kucerova (Charles University and National institute of mental health, Czech Republic), Jan Havlicek

Previous studies have found that personality dimensions of Agreeableness, Conscientiousness and Emotional stability are preferred in both men and women as potential partners. However, these studies vary in preferences for the dimension of Extraversion and Openness. The aim of our study was to test whether the personality characteristics of participants would have an effect on them meeting up with someone from the speed-dating session. Thus, we hypothesised that the participants with the desired personality dimensions would be more successful in speed-dating (i.e., they would meet someone from the session). We collected data from 145 participants (58 males and 87 females), who took part in commercial speed-dating sessions ran in the Czech Republic. Before they attended the speed-dating session, the participants completed the brief Big 5 questionnaire (assessing for Extraversion, Agreeableness, Conscientiousness, Emotional stability, Openness). We then compared the participants who met someone and who did not; analysing the data for men and women separately. The male participants who met someone scored significantly higher in Extraversion compared with the men who did not. Interestingly, no other personality dimension showed significant differences between the participants who met someone and who did not (men and women alike). Our results might indicate that personality dimensions play a relatively minor role in mate selection processes. However, this might be a consequence of time constraints of the mate selection during the speed-dating. These results highlight specificity of the speed-dating paradigm and its utility in modelling the mate selection processes.

Costs of reproduction are painted on women's faces

Urszula M. Marcinkowska (Jagiellonian University), Anthony C. Little, Andrzej Galbarczyk, Magdalena Klimek, Grazyna Jasienska

Having offspring is costly. Costs of reproduction result from energetic expenses of pregnancy, breast-feeding, and physiological changes driven by reproductive events. In women, parental investment may have long term-negative consequences and trade-offs between reproduction and health, and lifespan have been documented for many populations. In this study we examined whether lifetime reproductive costs are detectable on post-menopausal women's faces. We asked 575 participants, via online survey, to judge the attractiveness, health and perceived age of women who differed in parity. Stimuli faces were created in two ways: i) base pictures of faces of post-menopausal women were averaged and then composites of women with varying offspring number were presented, ii) base pictures of young women's faces were transformed to resemble averaged older faces of varying offspring number. All women were age matched so that only number of children varied between groups. We have found that for both younger and older stimuli pictures participants judged faces of women with lower parity as more attractive, healthier and younger than women with high parity. These results may reflect a by-product of a more general selection pressure to choose healthy social partners based on facial features. While the mechanisms behind our findings are not known, we have previously shown that women with higher parity have higher levels of oxidative stress in older age. Oxidative stress may contribute to faster ageing, including ageing of the face. Our study shows that lifetime reproductive investment can be detected on women's faces.

The effects of disease vulnerability on preferences for self-similar scent.

Naomi K. Muggleton (University of Warwick), Dr Corey L. Fincher

Humans possess disease avoidance mechanisms, which promote xenophobic attitudes and attraction to kin under conditions of perceived vulnerability to disease (PVD). This research aims to uncover the mechanisms which promote these behaviours. We investigate whether concerns about disease vulnerability influence attraction to olfactory cues of self-similarity. Participants donated a sample of their body odour, then completed a PVD questionnaire (subscales: germ aversion, perceived infectability; Duncan et al. 2009). Told that they were rating strangers' odours, participants rated self and non-self scent donations. Among women, attraction to self-scent was positively predicted by germ aversion (but not perceived infectability); surprisingly, men's ratings of self-scent were negatively associated with germ aversion. Potential confounds, such as outgroup dislike and women's fertility status, did not account for these findings. Taken together, this suggests that mere scent exposure can inform the receiver of the immunological similarity between self and sender, which can influence social responses (i.e. attraction to vs. avoidance of scent-sender). These findings have far reaching implications for the study of kin recognition and intergroup biases.

Influence of kin network on maternal and infant health and illness

Nathan Oesch (University of Oxford), Robin I. M. Dunbar

Background: The present study investigated the effects of supportive social network ties on health in a sample of mothers with a young child. The aim of this study was to examine if Liverpool participants having a large supportive network of close relatives reported less cases of illness than participants without such social support.

Methods: A cross-sectional design was employed whereby 74 randomly sampled mothers over the age of 20 with a child 24-36 months completed a questionnaire at twelve monthly time intervals over the course of one year. Multiple logistic regressions were applied to health survey data from participants from Liverpool collected from October 2001 to October 2002.

Results: Respondents living in Liverpool reported decreased illness rates with increased interpersonal contact. A statistically significant reduction in physical illness was observed for mothers and infants that had high contact frequency with close relatives. A statistically significant reduction in physical illness was also found for participants with a large social network of close relatives.

Conclusion: Results confirmed a potentially protective health relation for frequent contact with a large network of close relatives, but showed a less consistent picture for health benefits beyond a certain threshold of more distant relatives. Previous research has shown that social relationships can have a significant impact on psychological wellbeing, health and human disease, and so a greater understanding of social network structure is important to establish the need for preventive care and advice on maintaining important social relationships.

Mate Choice Copying Alters Perceptions of Male Attainability

Mark Ord (Northumbria University), Dr Tamsin Saxton, Dr Nick Neave

Objectives: Mate choice copying (MCC) is a cognitive bias which acts to increase judgements of a potential partners' attractiveness when same sex peers are seen to desire the potential partner. Research has shown that MCC occurs frequently in both animal species and humans. Recent research has begun to investigate factors which modulate the MCC bias. An example of this includes quality bias research which shows that the MCC effect is strongest when it is attractive peers whose choice is copied. This research aimed to understand if the MCC bias works to increase the likelihood a female would attempt to select a male.

Design and Method: An experimental design was used to assess MCC effects. 90 female participants were shown images of attractive and less attractive male faces in one of three conditions; alone and described as single, or described as in a relationship either with a pictured female who had been pre-rated as attractive, or with a pictured female who had been pre-rated as low in attractiveness. Participants rated males on a 1 to 9 likert scale for how attainable they were.

Results: Males, specifically less attractive males, paired with attractive females were rated significantly more attainable as mates than those paired with unattractive females or those presented as single.

Conclusions: MCC, as well as increasing judgements of attractiveness, may also make males appear as easier to acquire than single males. This could make the MCC bias a potential driver behind mate poaching (stealing the partners of others) behaviour.

Chicken or Champagne: Sex-Specific Mating Tactics in Drinking and Dining

Tobias Otterbring (Karlstad University)

Hunger, thirst, and sexual desire are among the most central of human needs. Yet, surprisingly few studies have examined if mating motives, such as mate attraction or mate competition, can alter people's preferences for certain foods and beverages. The present research investigates whether the physical appearance of male employees leads to sex-specific consumption preferences linked to drinking and dining. A total of 220 undergraduates (59% female) were given a survey and a photograph of an attractive-looking or ordinary-looking male employee. The survey was divided into two seemingly unrelated parts, in which the first was framed as investigating participants' impressions of the employee. Participants then responded to a few statements related to him, including a manipulation check of physical attractiveness, which ensured that the attractive-looking employee was perceived as more attractive than the ordinary-looking employee. Framed as a second part of the survey, participants indicated their consumption preferences for healthy and expensive foods and beverages. A 2 (participant gender) × 2 (employee: attractive, ordinary) × 2 (food: healthy, expensive) mixed ANOVA, with participant gender and employee condition as the between-subjects factors and food type as the within-subjects factor, revealed the hypothesized three-way interaction: Exposure to an attractive-looking male employee made women more motivated to consume healthy (but not expensive) foods and beverages; whereas men became increasingly inclined to consume expensive (but not healthy) foods and beverages. These findings imply that mating motives fundamentally influence people's consumption preferences in a way that is consistent with how men and women communicate their mate value.

Good enough for my daughter? Parental influences on offspring partner preferences

Tamsin Saxton (Northumbria University), Carmen Lefevre

Much research has focussed on individual preferences, and immediate context, to understand attraction. However, individuals do not make mate choice decisions in isolation, and at least three reasons should cause us to suspect that an individual's parents should be a particularly notable and universal source of influence. Firstly, an individual's partner choice can impact the parents' inclusive fitness. Second, parents shape partner choice through practices ranging from arranged marriage to approval or disapproval of their offspring's partner. Third, parents determine early experiences, which can shape later behaviours. Here, I will summarise two studies that examine the possible role of parental influence on the facial appearance of a potential partner. In Study 1, we assessed the facial preferences of 210 parents when judging potential partners for their grown-up daughters ($n = 125$), along with the preferences of those daughters. In line with our predictions, parents had clear directional preferences towards all fitness-denoting traits. There was also some evidence that both parents and daughters adjusted their preferences according to the daughter's attractiveness, and that parents prioritised markers of investment over quality, compared with their daughters. In Study 2, we measured parental faces, and compared these to daughters' preferences for faces that resembled their parents. We found only limited evidence for relationships between parental appearance and daughter preferences. In sum, parents may be an important source of variation for individual differences in partner preferences.

A call for re-evaluating psychopathy: Differences in the perceived intelligence of successful and unsuccessful psychopaths.

Sergio A. Silverio (University of Liverpool), Minna T. Lyons

Objective: There has been a surge of research investigating trait psychopathy, and its relationship to life success in domains such as wealth, income, academic study, and careers. Many of these studies have indicated secondary psychopathy relates to lower success, whereas primary psychopathy relates to higher success. This study explored whether people perceived primary and secondary psychopaths as different in intelligence using high-IQ and university attendance as proxies.

Method: In an on-line study, participants ($N = 458$; 384 women, 74 men) rated opposite-sex personality vignettes, differing for high- and low- primary and secondary psychopathy. These character statements were judged on an 11-point Likert-scale on likelihood of university attendance and high-IQ.

Results: For men rating the adverts of women, there was a significant interaction between the psychopathy level and type. Men rated high primary female adverts as significantly more intelligent than high secondary adverts, and low secondary adverts as more intelligent than high secondary adverts. We also found a significant interaction between the psychopathy type and level in women who were evaluating men's adverts for intelligence thus identical patterns were found across genders.

Conclusion: This exploration into perceived intelligence of primary and secondary psychopaths offers further evidence for these two subtypes having vastly different

compositions. Whilst neither subtype is desirable, it is clear primary psychopaths are seen as more successful and desirable. We conclude this adds to the growing argument for separation of primary and secondary psychopathy into two completely independent personality traits.

Personality of ideal and actual romantic partners among heterosexual and non-heterosexual men and women: A cross-cultural study

Zuzana Štěrbová (National Institute of Mental Health, Czech Republic), Marco Antonio Corrêa Varella, Klára Bártořová, Jaroslava Varella Valentova

Personality is crucial for social and romantic life. Although it was suggested that partner preferences influence actual partner choices, individuals do compromises when it comes to actual pairing. In humans, both sexes invest highly into reproduction, however, obligatory minimal parental investments are higher in females than in males which leads to a higher selectiveness in females. The main aim of this study was to examine possible differences in preferences and actual choice in personality (Five Factor Model) between heterosexual and non-heterosexual men and women from two different populations, Brazil and the Czech Republic. Further, we tested differences in the gap between ideal and actual partners (GIAP) between the studied groups. In the online survey participated 701 men (316 non-heterosexuals) and 1118 women (240 non-heterosexuals), who reported five personality dimensions (Extraversion, Emotional Stability, Openness, Agreeableness, Conscientiousness) of their own, their ideal partner, and, if coupled, actual partner. Compared to men of both sexual orientations, heterosexual and non-heterosexual women showed higher minimum standards in their ideal as well as actual partners. The smallest GIAP was found in heterosexual women. Furthermore, respondents from both countries indicated preferences and choice based on the mere exposure effect. Our results support the hypothesis that mate choice is based on preferences in personality, apart from sex, sexual orientation, and also population, which could indicate similarities of the evolved mind. Furthermore, in line with the parental investments theory, women were found to have higher standards and were able to translate their preferences better into actual choice than men.

Machiavellianism: a cool-minded strategy?

Linda Szijjarto (University of Pécs), Tamas Bereczkei

Objectives: In the last decade Machiavellianism was intensively studied in evolutionary psychology.

How do Machiavellian people behave in social dilemma situations? Do personality traits influence their strategy? Are they successful? In order to answer these questions, we used an experimental game and we measured personality features.

Methods: 116 university students (52 male, 64 female) took part in our study. To model social dilemma situations we used an experimental game, the so called Trust Game. The level of Machiavellianism was measured by the Mach IV-Questionnaire. Personality factors were measured by the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ).

Results: We found no significant relationship between the level of Machiavellianism and the deposits made by the first player. However, we found a negative significant relationship between the level of Machiavellianism and the deposits made by the second player.

Our results also show that there is a significant positive correlation between the level of Machiavellianism and the profit gained at the end of the experimental game. We found no significant correlation between the level of Machiavellianism and the personality factors.

Conclusions: Our results show that Machiavellian people use an exploiting strategy in social dilemma situations. They try to convince their partners about their trustworthiness in order to make them engaging in cooperation, then they exploit them. According to our results their strategy is successful; the profit gained by high-Machs is higher than the amount which was gained by the low-Machs.

The Influence of Intelligence on the Endorsement of the Intelligence-Attractiveness Halo

Sean N. Talamas (University of St Andrews), Kenneth I. Mavor, David I. Perrett

While some theories emphasize the influence of the 'attractiveness halo' on perceptions of intelligence, empirical evidence suggests that perceptions of attractiveness themselves can be influenced by perceptions of other desired traits such as intelligence. In an educational context, the effect of impressions of intelligence on teachers' expectations of students gives them particular significance. Research on kin selection and cognitive biases highlight the possibility that intelligent people endorse the intelligence-attractiveness relationship more strongly than less intelligent people. We investigated how a perceiver's intelligence can influence the association between perceived intelligence and attractiveness of others. We asked 126 participants to rate 48 children's faces for perceived intelligence and attractiveness and then asked them to complete the International Cognitive Ability Resource (ICAR) intelligence test. Ratings by participants who scored higher on the intelligence test showed a stronger relationship between perceptions of intelligence and attractiveness than participants who scored lower on the intelligence test. This effect was significant even after controlling for differences in participants' scale use. These findings, while preliminary, illuminate an individual difference that influences perceptions of intelligence with potentially concerning implications regarding expectancy effects in educational settings.

No significant association between 2D:4D ratio and fighting success in Mixed Martial Arts fighters

Vít Třebický (Charles University and National Institute of Mental Health, Czech Republic), Jitka Fialová, Jan Havlíček

The second to fourth digit ratio (2D:4D ratio), a putative biomarker of the organizational effects of prenatal levels of androgens, was previously associated with competition performance; low 2D:4D ratio is associated with better running performance and higher success rate in fencing or sumo wrestling. However, it was also proposed that, due to allometry, the differences in 2D:4D might be an epiphenomenon of differences in body size, which was not accounted for in previous studies.

Here we test the association between fighting success in Mixed Martial Art (MMA) male athletes and 2D:4D ratio while accounting for allometry. Direct anthropological measurements of 2nd and 4th digit lengths from both hands and fights statistics (number of fights and wins ratio) were collected from 54 amateur male MMA fighters from the

Czech Republic. Using partial correlations analyses, we found no significant association between their fighting success and 2D:4D ratio for both hands while controlling for the length of the fingers. The results remained non-significant even when using bivariate correlations with the simple 2D:4D ratio.

Although several previous studies showed evidence for the 2D:4D ratio being related to the sport and competition performance, recent meta-analyses challenges such results showing rather low overall effect sizes. Our results further support this notion, though the size of our sample is relatively small which may limit robustness of our null findings.

What does evolution in systems with non-particulate inheritance look like?

Petr Tureček (Charles University and National Institute of Mental Health, Czech Republic), Jakub Slavík, Michal Kozák, Jan Havlíček

Cultural traits lack the phenotype-genotype duality of biological systems and can be of a non-particulate nature. However, several objections are questioning the validity of selection in systems with non-particulate inheritance. Consequent to this, the majority of models of cultural evolution employ discrete traits.

Here, using computer simulations, we studied adaptation in systems with non-particulate inheritance. Our models are based on theoretical population consisting of individuals exhibiting a non-particulate quantitative trait. Survival and reproductive success of an individual was set to be dependent on the difference between the trait value and the previously set optimum. Individuals paired at random gave rise to the next generation. The average trait value of offspring was equal to parental average trait value; individual descendants were normally distributed around this value. A small proportion of them therefore exhibited a higher/lower trait value than both of their parents.

According to our simulations, the variability between individuals rises when the population is far from the optimum and declines rapidly when the peak in adaptive landscape is reached by some individuals. These patterns emerge regardless of most model parameters. However, we also observed that a population stabilized around a certain suboptimal value, when the effects of directional selection were outweighed by decreasing variability caused by small proportion of offspring exceeding parental trait range.

Our results convincingly show that non-particulate inheritance does not constitute a major problem for adaptation by the means of selection.

Human cooperation in groups: variation begets variation

Pieter van der Berg (University of Groningen), Lucas Molleman, Jaakko Junikka, Mikael Puurtinen, Franz J. Weissing

Many experiments on human cooperation have revealed that individuals differ systematically in their tendency to cooperate with others. It has also been shown that individuals condition their behaviour on the overall cooperation level of their peers. Yet, little is known about how individuals respond to heterogeneity in cooperativeness in their neighbourhood. Here, we present an experimental study investigating whether and how people respond to heterogeneous behaviour in a public goods game. We find that a large majority of subjects does respond to heterogeneity in their group, but they respond in

quite different ways. Most subjects contribute less to the public good when the contributions of their peers are more heterogeneous, but a substantial fraction of individuals consistently contributes more in this case. In addition, we find that individuals that respond positively to heterogeneity have a higher general cooperation tendency. The finding that social responsiveness occurs in different forms and is correlated with cooperativeness may have important implications for the outcome of cooperative interactions.

The lazy mindreader: why we rarely need to process embedded mindstates

Max van Duijn (Leiden University)

Human interaction has been claimed to be a process in which communicators seek to "join" their individual mindstates through working out what A intends that B understands that A wants B to believe... (etc.; Scott-Phillips, 2015). The conceptualisation of this task involving recursively embedded layers is also at the basis of the current paradigm of testing human "mentalising" abilities. While recent methodological improvements have made such tests more ecologically valid (O'Grady et al. 2015), I argue that they are still structurally at odds with real-life language usage and interaction: the field suffers from a fundamental misconception of the actual task.

Based on the analysis of corpora of spoken discourse, news reporting, and (literary) narratives, I demonstrate that the complexity of mindstates underlying interaction events is better understood as a network structure ("thoughtscape"; Van Duijn et al., 2015), than as linear strings of recursive embedding. Languages provide conventional "tools" for projecting and expediently navigating entire chunks of such thoughtscales at once. Only in exceptional cases, such as when repairing a misunderstanding, do we reconstruct situations in terms of individual mindstates ("I thought you wanted me to think..."). Consequently, most of human interaction is best not seen as the additive process described above, but instead as one in which interlocutors signal how to update a set of joint intentional states (cf. Clark, 1996). Ultimately this view is more consistent with a scenario in which languages/cultural-linguistic communities and higher-order mindreading abilities have co-evolved than one in which the latter were a prerequisite for the former to emerge.

Improving child feeding practices using Behaviour Centred Design in East Java, Indonesia

Sian White (London School of Hygiene and Tropical Medicine), Wolf Schmidt, Daniel Sabanggamu, Robert Aunger, Val Curtis

Background: Poor feeding practices cause widespread malnutrition and stunting among Indonesian children. We studied the effects of a novel behaviour change intervention, Gerakan Rumpi Sehat (the Healthy Gossip Movement), on infant and young child feeding practices in peri-urban East Java. The intervention was designed using a new behavioural theory, Behaviour Centered Design. This approach draws heavily on evolutionary psychology and avoids educational messaging in favour of employing emotional drivers such as affiliation, nurture and disgust.

Methods: Television commercials, community activations and house-to-house visits were used as delivery channels for the intervention. The evaluation took the form of a 2-arm

cluster randomised trial with a non-randomised control arm. One intervention arm received TV only, while the other received TV plus the other components. The intervention components were delivered over a three-month period to 12 villages in each arm. There were two primary outcomes; dietary diversity of complementary foods and the provision of unhealthy snacks to children 6-24 months of age.

Results: Dietary diversity scores increased by 0.8 points in the arm exposed to TV adverts only (95%CI: 0.4-1.2) and a further 0.2 points in the arm that received both intervention components (95%CI 0.6-1.4). In both intervention arms there were increases in the frequency of vegetable and fruit intake. We found inconsistent evidence of an effect on unhealthy snacking.

Conclusion: The study suggests that novel theory-driven approaches which employ emotional motivators are capable of having an effect on improving dietary diversity and the regularity of vegetable and fruit intake among Indonesian children.

When BOLD is Thicker than Water: Processing Social Information About Kin and Friends at Different Levels of the Social Network

Rafael Wlodarski (University of Oxford), Robin I. M. Dunbar

We carried out a study to examine differences in the neural processing of social information about kin and friends at different levels of closeness and social network level. Twenty-five female participants engaged in a cognitive social task involving different individuals in their network while undergoing fMRI scanning to detect BOLD signals. Greater levels of activation occurred in several regions of the brain previously associated with social cognition when thinking about friends than when thinking about kin, including the Posterior Cingulate Cortex and the ventral Medial Prefrontal Cortex (vMPFC). Linear parametric analyses across network layers further showed that, when it came to thinking about friends, activation increased in the ventral Medial Prefrontal Cortex (vMPFC), Lingual gyrus, and Sensorimotor cortex as individuals thought about friends at closer layers of the network. These findings suggest that maintaining friendships may be more cognitively exacting than maintaining kin relationships.

EHBEA 2016
LONDON