



# EUROPEAN HUMAN BEHAVIOUR & EVOLUTION ASSOCIATION



## **EHBEA'11** 6<sup>th</sup> International Conference

March 24 - 26, 2011  
Gießen, Germany

**PROGRAMME & ABSTRACTS**

*6<sup>th</sup> International Conference of the*  
**EUROPEAN HUMAN BEHAVIOUR &  
EVOLUTION ASSOCIATION (EHBEA)**

March 24 – 26, 2011

Gießen, Germany

**Organised by**

Eckart Voland and Jörg Wettlaufer

with the help from

Ulrich Frey, Johannes Johow, Hannes Rusch,  
Charlotte Störmer and Kai Willführ

**Supported by**

Galton Institute

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Giessener Hochschulgesellschaft

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President of Justus-Liebig University: Prof. Dr. Joybrato Mukherjee

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The cover picture shows 'Die 3 Schwätzer', a public sculpture in Gießen, created by Karl-Henning Seemann (photo by Charlotte Störmer). The back photo<sup>1</sup> is showing Justus-Liebig-University's main building. This conference book was built with '*generbook*'<sup>2</sup>.

<sup>1</sup>original uploader at [de.wikipedia: Amano1](https://de.wikipedia.org/wiki/Amano1)

<sup>2</sup>see Lusa L et al. 2009, Automated Preparation of the Book of Abstracts using R and LaTeX, *Informatica Medica Slovenica* 14: 10-18.

# Content

## Useful Informations

Conference Venue and Registration [5](#); City of Giessen [6](#); Organisational Issues [6](#)

## Programme Timetables

Overview [7](#); Thursday [8](#); Friday [10](#); Saturday [13](#)

## Plenaries

Hill [16](#); van Schaik [22](#); Grammer [31](#); Richerson [38](#); Milinski [51](#); Scott-Phillips [58](#)

## Best Rated Abstracts

Lamba [17](#); Lawson *et al.* [18](#)

### A) Attractiveness

Morrison *et al.* [20](#); Silva *et al.* [21](#)

### B) Life History Theory: Pay-offs in Growth and Longevity

Sear [23](#); van Bodegom *et al.* [24](#)

### C1) Machiavellism

Blanchard *et al.* [25](#); Lyons [26](#); Bereckei *et al.* [27](#)

### C2) Life History Theory: Early Contingencies

Störmer [28](#); Sheppard [29](#); Willführ *et al.* [30](#)

### D) Mating Strategies

Fieder *et al.* [32](#); Fortunato *et al.* [33](#)

### E) Preferences and Constraints in Mating

Stulp *et al.* [34](#); Antfolk *et al.* [35](#); Cobey *et al.* [36](#); Courtiol [37](#)

**F1) Cultural Evolution**

Ehn *et al.* [39](#); Matthews *et al.* [40](#)

**F2) Cooperation: Assortment**

Garcia *et al.* [41](#); Heady *et al.* [42](#)

**G1) Kin and Reproduction**

Johow [43](#); Smaldino *et al.* [44](#); Nitsch *et al.* [45](#); Atkisson *et al.* [46](#)

**G2) Cultural Transmission**

Mesoudi [47](#); Caldwell [48](#); Acerbi *et al.* [49](#); Toelch *et al.* [50](#)

**H) Game Theory**

Tane *et al.* [52](#); Paál *et al.* [53](#)

**I) Social Learning**

Morgan *et al.* [54](#); Bryson *et al.* [55](#); Takezawa [56](#); Kandler *et al.* [57](#)

**J1) Face Recognition**

Little *et al.* [59](#); Saxton *et al.* [60](#)

**J2) Cooperation: Dynamics**

Oberzaucher *et al.* [61](#); Frey *et al.* [62](#)

**K1) Hormonal Variation and Attractiveness**

Krams *et al.* [63](#); Lenochova *et al.* [64](#); Havlicek *et al.* [65](#); DeBruine *et al.* [66](#)

**K2) Darwinian Medicine: Adaptations & Beyond**

Cole *et al.* [67](#); Rantala *et al.* [68](#); Morgan *et al.* [69](#); Ploeger *et al.* [70](#)

**Poster Presentations**

subsequent [71](#)

## Useful Information

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### Conference Venue

The conference is held in the main building of the Justus-Liebig University of Gießen:

Universitätshauptgebäude

Ludwigstraße 23

35390 Gießen



### Registration and Conference Office

Registration desk and conference office are located in the entrance area of the building. Registration is possible Wednesday 16.00 – 20.00 and Thursday 8.00 – 16.00.

Opening hours of the conference office are 8:00 – 18:00.

There is also a conference office's cell phone which can be reached under +49176 5263 9477.

#### Hotel am Ludwigsplatz

Ludwigsplatz 8

35390 D-Giessen

phone: +49-(0)-641- 931130

fax: +49-(0)-641 / 390499

<http://www.hotel-am-ludwigsplatz.de/>

[webmaster@hotel-am-ludwigsplatz.com](mailto:webmaster@hotel-am-ludwigsplatz.com)

#### Best Western Hotel Steinsgarten

Hein-Heckroth-Str. 20

35390 D-Gießen

phone: +49-(0)-641-3899-0

fax: +49-(0)-641-3899-200

<http://www.steinsgarten.bestwestern.de/>

[info@steinsgarten.bestwestern.de](mailto:info@steinsgarten.bestwestern.de)

### What else to enjoy in Gießen

**Seltersweg** Here you can experience a bit of Gießen's 'city life'.

**Mathematikum** Interactive museum of mathematics (German website: [www.mathematikum.de](http://www.mathematikum.de)); Opening hours: Mon-Fri 15:00-18:00, Sat and Sun 10:00-19:00; Entrance: 6 Euro (students 4 Euro).

**Liebig Museum** Visit the original lab of Gießen's famous chemist (German website: [www.liebig-museum.de](http://www.liebig-museum.de)); Opening hours: Tue-Sun 10:00-16:00; Entrance: 3 Euro (students 2 Euro); Audioguide (German/English) 1 Euro.

**City Theatre** Dance theatre performance "Ein Sommernachtstraum" ('A Midsummer Night's Dream') on Friday the 25th March, beginning: 19:30. Tickets start at 15 Euro (max. 21,50 Euro).

### Barrier-free access

Access to the conference venue is barrier-free.

### Catering

We will provide lunch and coffee at the venue. As alternative, bistros and restaurants are available in close distance to the venue.

### Child Care Service

We will offer a professional child care service for parents.

### Conference Dinner

The conference dinner will take place on Saturday 26th in the restaurant 'Alt-Gießen' (see <http://www.hotel-alt-giessen.de>), which serves traditional German food and homebrewed beer.

### Internet Access

An internet room and free of charge WI-FI connection will be available.

### Taxi

Here you can find taxi phone numbers in Giessen:

Taxi Blitz (+49641) 962020

Taxi Minicar (+49641) 43030

Michel Taxi (+49641) 940100

Taxi Klos (+49641) 944400

## Programme Overview

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Wednesday	16.00 – 20.00 19.00 – .....	Registration Meeting of the German Group 'MVE' (see <a href="http://www.mve-liste.de">http://www.mve-liste.de</a> )
Thursday	8.15 – 15.00	Registration
	9.00 – 9.30	Opening of the Conference
	9.30 – 10.30	Plenary Lecture) Kim Hill
	10.30 – 10.45	Coffee
	10.45 – 12.00	Best Rated Abstracts
	12.00 – 12.15	Coffee
	12.15 – 13.05	Session A) Attractiveness
	13.05 – 14.30	Lunch
	14.30 – 15.30	Plenary Lecture) Carel van Schaik
	15.30 – 16.20	Session B) Life History Theory: Pay-offs in Growth and Longevity
	16.20 – 16.50	Coffee
	16.50 – 18.05	Session C1) Machiavellism                      Session C2) Life History Theory: Early Contingencies
	18.05 – 19.00	Poster Session and Wine
19.00 – 21.00	Welcome Buffet and Speed Science Dating	
Friday	9.00 – 10.00	Plenary Lecture) Karl Grammer
	10.00 – 10.50	Session D) Mating Strategies
	10.50 – 11.20	Coffee
	11.20 – 13.10	Session E) Preferences and Constraints in Mating
	13.10 – 14.30	Lunch
	14.30 – 15.30	Plenary Lecture) Peter Richerson
	15.30 – 16.20	Session F1) Cultural Evolution                      Session F2) Cooperation: Assortment
	16.20 – 16.50	Coffee
	16.50 – 18.45	Session G1) Kin and Reproduction                      Session G2) Cultural Transmission
	18.45 – 20.15	Poster Session and Wine
Saturday	9.00 – 10.00	Plenary Lecture) Manfred Milinski
	10.00 – 10.50	Session H) Game Theory
	10.50 – 11.20	Coffee
	11.20 – 13.10	Session I) Social Learning
	13.10 – 14.30	Lunch
	14.30 – 15.30	Plenary Lecture) Thom Scott-Phillips
	15.30 – 16.20	Session J1) Face Recognition                      Session J2) Cooperation: Dynamics
	16.20 – 16.50	Coffee
	16.50 – 18.45	Session K1) Hormonal Variation and Attractiveness                      Session K2) Darwinian Medicine: Adaptations and Beyond
	18.45 – 20.15	EHBEA AGM
	20.15 – .....	Conference Dinner

8.15–15.00 **Registration (also possible on Wednesday 16.00 – 20.00)**

Room: Foyer

9.00–9.30 **Opening of the Conference**

Room: Main Auditorium

1. **Short Welcoming Speech** *Eckart Voland and Jörg Wettlaufer (Organising Committee)*
2. **Address of Welcome** *Joybrato Mukherjee (President of Justus-Liebig University)*
3. **Opening Address** *Robert Barton (President of EHBEA)*

9.30–10.30 **Plenary Lecture**

Room: Main Auditorium

*Chair: Jörg Wettlaufer*

- **The Origins of Human Uniqueness** *Kim Hill*

10.30–10.45 **Coffee**

Room: Lobby

10.45–11.35 **Best Rated Abstracts**

Room: Main Auditorium

*Chair: Rebecca Sear*

1. **Social learning in the cooperative domain: Evidence from public goods game experiments** *Shakti Lamba*
2. **The life history trade-off between fertility and child survival** *David W. Lawson and Mhairi Gibson*

11.35–12.00

- **Social networks and out-migration of a rural population in Oromo region, Ethiopia** *Lucie Clech and Mhairi Gibson*

12.00–12.15 **Coffee**

Room: Lobby

12.15–13.05 **Session A) Attractiveness**

Room: Main Auditorium

*Chair: Boguslaw Pawlowski*

1. **Attractiveness constancy: Is facial attractiveness stable?** *Edward Morrison, Paul Morris and Kim Bard*
2. **Do Attractive People Have More Children? A Cross-Cultural Study on Facial Attractiveness and Reproductive Success** *Antonio Silva, Alexandra Alvergne, Virpi Lummaa, Michel Raymond, Allan Mazur and Ulrich Mueller*

13.05–14.30 **Lunch**

Room: Lobby

14.30–15.30 **Plenary Lecture**

Room: Main Auditorium

Chair: Gillian Brown

- **Cooperative breeding and the evolution of our unique features** *Carel van Schaik*

15.30–16.20 **Session B) Life History Theory: Pay-offs in Growth and Longevity**

Room: Main Auditorium

Chair: Anna Rotkirch

1. **What are the pay-offs to growth in later life? A survey of height and reproductive outcomes in adulthood** *Rebecca Sear*
2. **Selection for longevity in a polygamous human society in rural Africa** *David van Bodegom, Linda May and Rudi G.J. Westendorp*

16.20–16.50 **Coffee**

Room: Lobby

16.50–18.05 **Session C1) Machiavellism**

Room: Main Auditorium

Chair: Judith Burkart

1. **A chip off the old block: Uncaring Fathers and Psychopathy** *Alyson Blanchard, Minna Lyons and Galina V. Paramei*
2. **Mother cold, father controlling? Relationships between childhood experiences, Machiavellianism, and functioning in social relationships** *Minna Lyons*
3. **Is Machiavellian Intelligence a primary factor in human cognitive evolution? - An fMRI study** *Tamas Bereczkei, Anita Deak and Peter Papp*

16.50–18.05 **Session C2) Life History Theory: Early Contingencies**

Room: Biological Lecture Hall, upstairs

Chair: Elisabeth Oberzaucher

1. **Early environmental stress and fast male life histories** *Charlotte Störmer*
2. **The association between father absence and the timing of male reproductive decisions: evidence from a cohort of British men** *Paula Sheppard*
3. **Death Clustering of Infants in Second Marriages in Two Historical Populations** *Kai P. Willführ and Alain Gagnon*

18.05–19.00 **Poster Session and Wine**

Room: Rector's Hall and Lobby

19.00–21.00 **Speed Science Dating and Welcome Buffet**

Room: Senate's Hall and Foyer

9.00–10.00 **Plenary Lecture**

Room: Main Auditorium

*Chair: Lisa DeBruine*

- **The crocodile is substantially greener than it is long: about the current status of attractiveness research in evolutionary psychology** *Karl Grammer*

10.00–10.50 **Session D) Mating Strategies**

Room: Main Auditorium

*Chair: David Lawson*

1. **Mate Choice and Health: Effects of own and spouse's characteristics on health estimation and susceptibility to diseases in men and women** *Martin Fieder and Susanne Huber*
2. **Mother knows best: revisiting the paternity threshold model** *Laura Fortunato and Marco Archetti*

10.50–11.20 **Coffee**

Room: Lobby

11.20–13.10 **Session E) Preferences and Constraints in Mating**

Room: Main Auditorium

*Chair: Jeremy Kendal*

1. **Similarities and differences between partner height preferences and actual partner heights** *Gert Stulp, Thomas V. Pollet, Simon Verhulst, Daniel Nettle and Abraham P. Buunk*
2. **Men's and women's sexual interest and actual sexual behaviour as a function of both the participant's and the partners' ages** *Jan Antfolk, Benny Salo and Katarina Alanko*
3. **Testosterone levels are positively associated with the lifetime number of opposite sex partners in a large sample of elderly American men** *Kelly D. Cobey, Leander van der Meij, Abraham P. Buunk and Thomas V. Pollet*
4. **What room for choice in mutual mate choice?** *Alexandre Courtiol*

13.10–14.30 **Lunch**

Room: Lobby

14.30–15.30 **Plenary Lecture**

Room: Main Auditorium

*Chair: Laura Fortunato*

- **The Case for Cultural Group Selection** *Peter Richerson*

15.30–16.20 **Session F1) Cultural Evolution**

Room: Main Auditorium

Chair: Werner J. Patzelt

1. **Specialization: A driving force in cultural evolution – Theory and data** *Micael Ehn, Anna-Carin Stymne and Magnus Enquist*
2. **Group markers and cultural diversity in experimental microsocieties** *Cristina Matthews, Christine A. Caldwell and Gareth Roberts*

15.30–16.20 **Session F2) Cooperation: Assortment**

Room: Biological Lecture Hall, upstairs

Chair: Ulrich Frey

1. **Assortment and repetition: a recipe for cooperation** *Julian Garcia and Matthijs van Veelen*
2. **An approach to studying cooperation between kin** *Patrick Heady*

16.20–16.50 **Coffee**

Room: Lobby

16.50–18.45 **Session G1) Kin and Reproduction**

Room: Main Auditorium

Chair: Athanasios Chasiotis

1. **Reproductive strategies under socioeconomic constraints: Modelling effects of Krummhörn grandmothers on fertility decisions of their daughters and daughters-in-law (18th and 19th centuries, Germany)** *Johannes Johow*
2. **What if Romeo and Juliet had listened to their parents? An agent-based model of parental involvement in human mate choice** *Paul E. Smaldino, Lesley Newson, Jeffrey C. Schank and Peter J. Richerson*
3. **Are elder siblings helpers or competitors? Long-term fitness effects of sibling interactions in a Finnish population.** *Aida Nitsch, Charlotte Faurie and Virpi Lummaa*
4. **How do kin impact reproduction? A comparison of kin support and kin influence models** *Curtis Atkisson, Mary K. Shenk and Mary C. Towner*

16.50–18.45 **Session G2) Cultural Transmission**

Room: Biological Lecture Hall, upstairs

Chair: Alex Mesoudi

1. **An experimental comparison of human social learning strategies: payoff-biased social learning is adaptive but under-used** *Alex Mesoudi*
2. **The establishment of arbitrary symbolic communicative conventions in experimental microsocieties** *Christine A. Caldwell*
3. **Cultural transmission of preferences creates fashions and fads** *Alberto Acerbi, Stefano Ghirlanda and Magnus Enquist*

*FRIDAY, March 25, 2011*

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4. **Trait stickiness in cumulative cultural evolution depends on accuracy of individual information** *Ulf Toelch, Peter J. Richerson, Simon M. Reader, Lesley Newson, Richard McElreath and Mark Lubell*

18.45–20.15 **Poster Session and Wine**  
Room: Rector's Hall and Lobby

9.00–10.00 **Plenary Lecture**

Room: Main Auditorium

Chair: *Alexandre Courtiol*

- **The climate change game** *Manfred Milinski*

10.00–10.50 **Session H) Game Theory**

Room: Main Auditorium

Chair: *Mhairi Gibson*

1. **Experimental evidence of the reversed observer effect in the human cooperation**  
*Kengo Tane and Masanori Takezawa*
2. **Alternative roles of punishment in experimental settings: Beside strong reciprocity**  
*Tünde Paál and Tamás Bereczkei*

10.50–11.20 **Coffee**

Room: Lobby

11.20–13.10 **Session I) Social learning**

Room: Main Auditorium

Chair: *Ulf Toelch*

1. **The evolutionary basis of human social learning** *Thomas J. H. Morgan, Luke E. Rendell, Micael Ehn and Kevin N. Laland*
2. **The impact on organisms of transmitting secondary replicator systems** *Joanna J. Bryson and Sam P. Brown*
3. **Adaptive toolbox of “who” strategies in social learning** *Masanori Takezawa*
4. **The interplay between individual learning and social transmission in heterogeneous environments** *Anne Kandler and Kevin N. Laland*

13.10–14.30 **Lunch**

Room: Lobby

14.30–15.30 **Plenary Lecture (New Investigator Award Winner)**

Room: Main Auditorium

Chair: *Robert Barton*

- **Communication, cognition, and the origins of language** *Thom Scott-Phillips*

15.30–16.20 **Session J1) Face Recognition**

Room: Main Auditorium

Chair: *Kai Willführ*

1. **Exposure to visual cues of pathogen contagion changes preferences for masculinity and symmetry in opposite-sex faces** *Anthony Little, Lisa M. DeBruine and Benedict C. Jones*
2. **Women prefer faces that resemble their partners** *Tamsin Saxton, Bernard Tideman and Dengke Xiao*

**15.30–16.20 Session J2) Cooperation: Dynamics**

Room: Biological Lecture Hall, upstairs

*Chair: Eckart Voland*

1. **Fast and frugal algorithms: Error management in games** *Elisabeth Oberzaucher and Karl Grammer*
2. **Group dynamics in public goods games** *Ulrich Frey and Hannes Rusch*

**16.20–16.50 Coffee**

Room: Lobby

**16.50–18.45 Session K1) Hormonal Variation and Attractiveness**

Room: Main Auditorium

*Chair: Tamas Bereczkei*

1. **Body height, testosterone, vocal and facial attractiveness in men** *Indrikis Krams, Sanita Kecko, Ilona Skrinda, Tatjana Krama and Markus J. Rantala*
2. **Fragrant expectations - Changes of female body odour quality during pregnancy and after the delivery** *Pavlina Lenochova and Jan Havlicek*
3. **Changes in preferences for MHC-heterozygosity across menstrual cycle** *Jan Havlicek, Katerina Ptackova, Katerina Vavrova and S. Craig Roberts*
4. **Regional variation in women's masculinity preferences** *Lisa M. DeBruine, Benedict C. Jones, Anthony C. Little, John R. Crawford and Lisa L. M. Welling*

**16.50–18.45 Session K2) Darwinian Medicine: Adaptations and Beyond**

Room: Biological Lecture Hall, upstairs

*Chair: Sue Aitken*

1. **How phobia of threatening animals may generalise to other animals** *Geoff G. Cole and Arnold J. Wilkins*
2. **Immune defence and the attractiveness of men's body** *Markus J. Rantala, Tatjana Krama and Indrikis Krams*
3. **Adaptive Psychopathic traits** *Keith Morgan, Sue Aitken and Holly Nodwell*
4. **Autism and schizophrenia: adaptations or evolutionary developmental disorders?** *Annemie Ploeger and Frietson Galis*

**18.45–20.15 EHBEA AGM** Room: Main Auditorium

**20.15– Conference Dinner** in the Restaurant 'Alt-Gießen'

## ***TALK ABSTRACTS***

## Plenary Lecture

### The Origins of Human Uniqueness

*Kim Hill*

Institute of Human Origins, State University of Arizona, Tempe, Az, USA; kim.hill\_at\_asu.edu

Although scientists are aware that humans share the same biological heritage as do all other organisms on the planet, the reliance of *Homo sapiens* on culture and cooperation has resulted in what can best be described as “a spectacular evolutionary anomaly.” The extrasomatic adaptations, technological dominance, and success of our species in colonizing every terrestrial habitat have no parallel. Identifying the causes of human uniqueness is one of the most exciting and philosophically profound issues of all scientific research. Despite this, only recently have theoretical and empirical advances allowed research to focus directly on human uniqueness. Although cultural and biological views of human behavior have been at odds for at least a half-century, recent research on culture-gene interaction has begun to converge on a paradigm that integrates not only areas of anthropology, but all the biological, social, and behavioral sciences. Recent studies of life history, experimental economics, animal social learning, and cognitive and evolutionary psychology, combined with findings from biological anthropology, define a set of key traits in the emergence of human uniqueness. These include large brains, long adult life spans, protracted juvenile dependence, an obligate postreproductive period, prosocial emotions that promote extensive cooperation with nonkin, complex communication, and a reliance on social learning that produces cumulative cultural adaptation and social norms that regulate all aspects of life. These derived traits span physiological adaptations, behaviors, cognitive abilities, and evolved emotions not seen in our closest primate relatives.

## Best Rated Abstracts

### **Social learning in the cooperative domain: Evidence from public goods game experiments**

*Shakti Lamba*

Department of Anthropology, University College London, London, UK; s.lamba\_at\_ucl.ac.uk

**Objective:** Cultural group selection models posit that large-scale cooperation in humans evolves via group-level selection acting on populations amongst which behavioural variation is maintained by cultural transmission. Hence, the models assume that individuals acquire cooperative strategies via social learning. However, this core assumption remains empirically untested for the most part. I investigated whether individuals employ pay-off biased, conformist and individual learning when making decisions in a public goods dilemma. **Methods:** I tested whether individuals playing a public goods game use information about others' behavioural strategies to make their decisions; the experiments were conducted in 14 villages of the same endogamous small-scale forager society, the Pahari Korwa of central India. I compared the prevalence of different learning strategies across the 14 villages and assessed the association of properties of populations and individuals with the learning strategy employed by an individual. **Results:** The majority of individuals do not employ conformist or payoff biased learning in the context of a cooperative dilemma. The frequencies of different learning strategies are highly variable across populations; this variation is partly explained by demographic differences between populations, most notably population size. **Conclusion:** My findings suggest that whether individuals use social learning in the cooperative domain or not, and the extent to which they do so, depends considerably on the environment they live in; individuals do not use a uniform learning strategy across all environments and irrespective of their circumstances. Theoretical work is required to clarify whether these low and variable levels of social learning can maintain the stable between-population behavioural differences that are essential for selection at the group-level.

## The life history trade-off between fertility and child survival

*David W. Lawson<sup>1</sup> and Mhairi Gibson<sup>2</sup>*

<sup>1</sup>University College London, London, UK; d.lawson\_at\_ucl.ac.uk

<sup>2</sup>University of Bristol, Bristol, UK

**Objective:** We consider the evidence that humans face a life history trade-off between fertility and child survival, and question the often-assumed importance of such a trade-off in explaining the limits of high fertility in traditional and developing populations. Previous anthropological and demographic studies have found mixed evidence for this trade-off and unfortunately, due to methodological limitations, have left us with little empirical ground to evaluate its true generalizability and what individual and socioecological factors may influence its local importance. **Methods:** A multi-level modelling framework is used to establish the relationship between fertility and child survival in representative demographic surveys from rural and urban regions of 27 Sub-Saharan African countries. **Results:** In attempt to account for potential confounding associations (i.e. phenotypic correlations') and alternative causal mechanisms, we investigate how various methods of estimating this relationship influence the results. We then consider whether or not limiting fertility can ever maximize overall child survival in the Sub-Saharan African context, demonstrating that this is only possible when childhood mortality rates are already very high. Finally, we identify important variation in trade-off functions cross-regionally and between mothers consistent with the expectation that a reduction of extrinsic mortality strengthens associations between parental investment and child survival. **Conclusion:** We demonstrate that a trade-off between fertility and child survival alone is rarely strong enough to explain why even high fertility societies limit reproduction to some extent. This may be because most sources of mortality in such populations are extrinsic (care-independent). A stronger association between fertility and remaining sources of mortality in wealthier regions/families supports the argument that population transitions to low fertility are triggered by increased reliably in the returns to parental investment on child outcomes.

## **Social networks and out-migration of a rural population in Oromo region, Ethiopia**

*Lucie Clech and Mhairi Gibson*

University of Bristol, Bristol, UK; Lucie.Clech\_at\_bristol.ac.uk

**Objective:** An exploration of patterns of social networks and out-migration in the context of scarcity of land in a traditional rural Ethiopian community where recent population growth has increased within and between household resource-competition. **Methods:** This research is a unique opportunity to study the causes and consequences of rural out migration to exploit new and emerging urban employment opportunities in a contemporary African population. Anthropological, demographic, economic and social network data were collected from 472 rural-urban migrants and from 590 rural households in one regional capital and two villages in 2009. In this paper, we focus on social networks, reciprocity and cooperation. Wealth, kin and non kin effects, intrahousehold competitive and cooperative effects based on sex are investigated in order to identify social determinants of the migration decision. Multivariate, logistic and general linear model, using SPSS software, were used to analyze the database. **Results:** 17% of the households of the 2 villages have at least one out-migrant members. Head of household's network composition and size explains differences between households. Household's levels of resources also have an impact on migration, although very few remittances from migrant's member were reported. At household level, individual migration strategies may be connected to social networks. Brothers and sisters show different strategies in allocating their help, showing different patterns of kin/non kin cooperation and reciprocity. **Conclusion:** Social networks and resources availability explain important differences of migration's strategies at the household level. Low levels of remittances suggest there is currently no immediate benefit of an individual's migration for the family. Sibling cooperation and competition, resources availability and sex may explain differences in migration strategies at the household and individual level.

## Session A) Attractiveness

### **Attractiveness constancy: is facial attractive attractiveness stable?**

*Edward Morrison, Paul Morris and Kim Bard*

University of Portsmouth, Portsmouth, UK; ed.morrison\_at\_port.ac.uk

Objective: Evolutionary theory posits that physical attractiveness is an indicator of biological quality such as good genes. Since these qualities do not change quickly, attractiveness should be a stable property. On the other hand, recent evidence has suggested that transient factors such as gaze direction and emotional expression affect facial attractiveness. We aimed to compare the relative quantitative contributions of variation between individual faces with variation within faces due to emotional expressions. Methods: We used the Warsaw set of Emotional Facial Expression pictures to obtain photographs of 14 men and 16 women displaying the 6 basic emotional expressions (anger, disgust, fear, happiness, sadness, surprise) and a neutral expression, giving 210 photographs in total. These pictures were rated for attractiveness by 73 participants, each of whom saw each model only once with a randomly chosen expression. Results: Inter-rater agreement was high (Cronbach's  $\alpha = .767$ ), so average attractiveness scores were calculated for each picture. To compare the relative effects of identity and emotion, we calculated eta-squared effect sizes for between and within participant variation. Identity was 2.7 times as important as emotion in attractiveness. Splitting the analysis by sex of picture revealed that this result was similar for both male and female pictures. Conclusion: This is the first study to compare the relative importance of variation within and between faces. Facial identity is much more important than emotional expression in attractiveness judgments, which is consistent with the idea that attractiveness is a stable property of the face and can be explained in terms of facial structure. Since the hard tissue of the face are unchangeable, people may still be able to perceive facial structure whatever expression the face is displaying, and still make attractiveness judgements based on cues such as facial symmetry, averageness, or dimorphism.

## **Do Attractive People Have More Children? A Cross-Cultural Study on Facial Attractiveness and Reproductive Success**

*Antonio Silva<sup>1</sup>, Alexandra Alvergne<sup>2</sup>, Virpi Lummaa<sup>2</sup>, Michel Raymond<sup>3</sup>,  
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Evolutionary models of human mate choice generally assume that physical attractiveness is a sexually selected trait, i.e. associated with higher mating opportunities and subsequent reproductive success. However, few studies have tested whether attractiveness is (i) heritable and (ii) related to reproductive success (RS), two fundamental prerequisites for selection to operate. In this study, the relationship between facial attractiveness and RS was investigated in two different socio-ecological settings: rural Senegal (73 men and 107 women) and the USA (35 men). The results show that facial attractiveness is not heritable and is not associated with either quantity and/or quality of offspring in Senegal, and negatively predicts the number of grandchildren in the U.S.A. This relationship is controlled for facial dominance, which positively predicts RS and is heritable, suggesting that facial dominance rather than facial attractiveness as a whole is a sexually selected trait. This study illustrates the relevance of testing key evolutionary assumptions using contemporary populations to understand the evolution of mate preferences for physical attractiveness.

## Plenary Lecture

### Cooperative breeding and the evolution of our unique features

*Carel van Schaik, Judith Burkart and Karin Isler*

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Humans emerged as a distinct lineage among the African great apes approximately 6 million years ago. Several decades of field and laboratory research on both apes and humans have served to highlight many similarities between humans and apes in mind and behavior. At the same, however, they have underscored the differences, which are, from the perspective of evolutionary biology, surprisingly large. I examine the hypothesis that the adoption of cooperative breeding in early representatives of our genus (*Homo*) approximately 2 million years ago caused a radical departure in social life, life history, psychology and eventually cognition that put us on the path toward modernity. This hypothesis is examined using a comparative approach, involving broad surveys of birds and mammals as well as detailed comparisons around callitrichid monkeys, the only true cooperative breeders among nonhuman primates.

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## **Session B) Life History Theory: Pay-offs in Growth and Longevity**

### **What are the pay-offs to growth in later life? A survey of height and reproductive outcomes in adulthood**

*Rebecca Sear*

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Objective: Height is a plastic trait: it is partly genetically determined but also represents the outcome of the life history decision over when to switch off investment in growth and divert resources to reproductive effort instead. That decision will be partly affected by the pay-offs to size in adulthood: where the pay-offs are greater, individuals should invest more in growth. Here I review the reproductive costs and benefits of height in adulthood: is height associated with mortality risk, mating success and fertility outcomes for each sex, and how do these associations differ between environments? Methods: a literature search was performed for all published studies which presented statistical associations between adult height and: (1) mortality: the risk of mortality for that individual or the individual's children, (2) mating success: the probability of, or number of, marriage(s), (3) fertility outcomes: age at first birth, total number of children and total number of surviving children. Data are included from both developed and developing world populations. Results: It is clear from this survey that relationships between height and fitness correlates show considerable variation between populations, suggesting that the pay-offs to growth depend on ecological conditions. The only associations which appear to be common to all environments are those between height and age at reproductive maturity for women (almost invariably positive) and between maternal height and child mortality (almost invariably negative). Despite the picture of variability, however, there are some systematic differences between men and women: while tall height is not universally beneficial for women and short height may sometimes be advantageous, short height is rarely advantageous for men but tall height usually is. Conclusion: The relatively greater benefits of height for men compared to women may therefore help explain the maintenance of sexual dimorphism in stature for our species.

## Selection for longevity in a polygamous human society in rural Africa

*David van Bodegom*<sup>1</sup>, *Linda May*<sup>2</sup> and *Rudi G. J. Westendorp*<sup>1</sup>

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Objective: Human longevity has long been considered to be beyond evolutionary control. Over the past decades however, various adaptive theories have been put forward focusing on the indirect selective advantage of post-reproductive survival in women, optimizing the reproductive success of their (grand)children. Recent data show that in polygamous populations older men continue successful reproduction up to high age and may have directly contributed to selection for longevity. Our objective was to assess the selective advantage of longevity in both men and women in a two sex model. Methods: From 2002 through 2010 we have prospectively followed 28,994 individuals in 1,703 households from a contemporary polygamous African population that may well resemble our recent evolutionary past. In a full kin analysis, we assessed both the direct selection for longevity through continued reproduction in men and the indirect selection for longevity through the effect of older women and men on reproduction and offspring survival of the household. Results: We observed a direct selection for longevity in men; of all 3,645 observed newborns, 18.4 % were born of fathers aged fifty and above. We also observed an indirect selection for post-reproductive survival in women; within households, the presence of women aged fifty and above accounted for 2.6% of total number of newborns in households. We also observed that the presence of older men suppressed the total number of newborns in households by 6.7%. Offspring survival up to reproductive age was not affected by the presence of either older women or older men. Conclusions: Our results suggest that human post-reproductive survival evolved predominantly through direct selection for longevity in older men, more than via an indirect selection for post-reproductive survival in older women, as often suggested.

## Session C1) Machiavellism

### A chip off the old block: Uncaring Fathers and Psychopathy

*Alyson Blanchard, Minna Lyons and Galina V. Paramei*

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**Objective:** The qualitative differences between Primary Psychopathy (interpersonal manipulation, pathological lying, callousness) and Secondary Psychopathy (impulsiveness, reactive anger, criminality) suggest genetic and environmental aetiologies for both factors of Psychopathy respectively. Psychopathy has also been theorised as an evolutionary adaptive trait, utilising cheater? and/or reproductive r? strategies. It is arguable that Primary Psychopathy is the heritable trait. We sought to ascertain possible explanations of origins of subclinical Primary and Secondary Psychopathy by exploring their relationship to attachment styles and parental bonding within an empirical study format. It was predicted that maladaptive attachment and bonding would predict Secondary Psychopathy. **Method:** Participants were invited to partake in the online survey via adverts posted on social networking sites. 131 participants (31 male, aged 16-67) completed four questionnaires that assessed (i) attachment styles (Relationship Questionnaire and Relationship Scales Questionnaire); (ii) parental bonding (Parental Bonding Instrument) and (iii) Psychopathy (Self Report Psychopathy scale III). Multiple correlations assessed relationships between the measures. **Results:** Both Primary and Secondary Psychopathy positively correlated with Dismissive and Fearful attachment styles. Contrary to our prediction, reduced paternal warmth was found to positively correlate with the Primary Psychopathy sub-scale Interpersonal Manipulation. **Conclusion:** Manipulative individuals recollect their fathers as cold and uncaring. We suggest that this trait has been inherited from the father and therefore supports the tenet that Primary Psychopathy manifests some genetically adaptive quality rather than Secondary Psychopathy. Further research is required to elucidate more deeply the different characteristics of Primary and Secondary Psychopathy as both revealed similar attachment patterns.

## **Mother cold, father controlling? Relationships between childhood experiences, Machiavellianism, and functioning in social relationships**

*Minna Lyons*

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**Objective:**Trait Machiavellianism and adverse childhood experiences have both been, independently, related to malfunctioning in social relationships. Both findings make sense from adaptationist point of view. If Machiavellianism is an evolutionary cheater strategy?, having close, warm friendships wouldn't be expected in individuals high in this trait. Furthermore, experiencing sub-optimal parenting as a child signals that the environment is hostile, and that less trusting personal relationships would bring more benefits for an individual. The present study investigated the relationships between Machiavellianism, attachment, parental bonding and importance of friendships. **Method:**The Friendship Questionnaire and The Mach IV scale together with attachment and parental bonding measures were completed on-line by 309 participants (56 males). **Results:**Secure attachment and perceived maternal care fully mediated the relationship between Machiavellianism and friendship quality. This indicates that Machiavellian individuals, who had warm and caring mothers and secure attachment styles function better in close friendships. Furthermore, cross-correlations showed that perceived maternal care correlated negatively with Machiavellianism and positively with friendship quality, and that overprotective maternal styles correlated positively with friendship quality, and overprotective paternal styles correlated positively with Machiavellianism. **Conclusion:**The results point to significant role of childhood environment in both the development of Machiavellianism and functioning in friendships. Rather than Machiavellianism per se, attachment and parenting styles were more important determinants of friendship quality as an adult. Furthermore, having a cold, uncaring mother and a restrictive, overprotective father were the strongest determinants of Machiavellian tendencies. The findings underline the role of Life History Theory as an explanation for adaptive behavioural responses.

## **Is Machiavellian Intelligence a primary factor in human cognitive evolution? - An fMRI study**

*Tamas Bereczkei, Anita Deak and Peter Papp*

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**Objectives** In the light of Machiavellian Intelligence hypothesis, the ability to manipulate others has selected for increased brain size and sophisticated mental capacities in humans. However, recent studies have revealed a negative correlation between Machiavellianism and the hot and cold measures of theory of mind. Furthermore, high-Mach individuals appear to have deficits in several areas of social cognition. These failures may impose limits on the evolutionary considerations of Machiavellian Intelligence. At the same time, however, several studies have also proved that Machiavellian strategies are very successful in a competition with others for gaining resources. The present lecture makes an attempt to solve this controversy. **Methods** We present a study that used 3-T fMRI measurements of 20 high-Mach and low-Mach persons who played a version of Trust Game. In the 12 trials of the game, participants transferred money as both player 1 and player2. We measured differences in brain activities between low-Mach and high-Mach persons in the conditions of both correct and incorrect contexts. **Results** Compared to low-Machs, high-Mach persons shown significantly higher activation in specific brain areas that are linked to the cognitive control and the inhibition of proponent responses (dorsolateral prefrontal cortex), the evaluation of punishing stimuli (orbitofrontal cortex), the representation of emotional states (left insula), and the process of cognitive conflicts (anterior cingulate cortex). Furthermore, when measuring behavioral output, high-Machs obtained the highest sum of money by the end of the game. **Conclusions** All of these results suggest that Machiavellian people recruit higher-level cognitive processes during decision making on social dilemmas. They can efficiently evaluate the others' thoughts and emotions, and develop an optimum strategy of manipulation. Therefore, a neuronal approach may provide a support for the Machiavel

## **Session C2) Life History Theory: Early Contingencies**

### **Early environmental stress and fast male life histories**

*Charlotte Störmer*

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Objective: Extrinsic mortality is one of the most influential environmental factors shaping (human) life histories. Several studies on humans could show that females living in low-quality environments (high morbidity/mortality) tend to have faster life histories. But little is known about the life histories of males in relation to the environmental conditions they face during early development. Methods: I addressed the question how male life histories are influenced by early mortality rates analyzing historical family data from the 18th century Krummhoern population. Using Event History Analysis and mixed effects models both survival rates and reproductive parameters (age at first birth, number of children, proportion of children surviving to adulthood) were compared between males born during the smallpox epidemic in 1753 and a control group comprising those not confronted with high mortality early in life. Results: The results of the Event History Analysis show an increased mortality risk early in life (up to age 15) for those males born into a high mortality environment. Concerning the reproductive parameters males exposed to high rates of mortality reproduce significantly (1.5 years) earlier than the control group and they have a smaller proportion of offspring surviving to adulthood. Conclusion: This study supports the hypothesis that not only females adjust the speed of their life histories to local mortality rates. Confronted with a high mortality environment early in life, males show a reduced life expectancy. If survival is therefore unpredictable (or unlikely) selection favours the evolution of fast male life histories because early reproduction and investment in offspring quantity increase the chance of producing at least some offspring.

## **The association between father absence and the timing of male reproductive decisions: evidence from a cohort of British men**

*Paula Sheppard*

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**Objective:** The role of fathers is something of an evolutionary puzzle. In terms of offspring survival, a number of studies have shown that father absence sometimes has negative consequences but often does not. These findings suggest that fathers are either not beneficial for young offspring or that they confer benefits other than for child survival. Father absence in relation to girls' reproductive timing has been fairly well documented but little has been done to test the effects of father absence on the timing of boys' life history decisions. This study aimed to redress that imbalance. **Methods:** Drawing upon data from the National Child Development Study, a cohort of British children born during March in 1958, this study tested whether father absence was associated with the timing of male reproductive events, the timing of puberty, and whether discriminating between the loss of the father at different childhood stages was a relevant factor. **Results:** The results suggest that father absence, before the age of seven, is related to earlier timing of reproduction compared with young men whose families remained intact. Contrary to my prediction, voice-breaking (used as a proxy for puberty) appears to be delayed rather than accelerated and this effect is found only when father absence occurs during adolescence but not at any younger age. **Conclusion:** This is contrary to what Life History Theory would predict and to what many studies have indicated in relation to the timing of girls' menarche and therefore requires further research.

## Death Clustering of Infants in Second Marriages in Two Historical Populations

*Kai P. Willführ<sup>1</sup> and Alain Gagnon<sup>2</sup>*

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Objective: Infant deaths are not distributed randomly within a population. This phenomenon is called death clustering and can often be explained by extrinsic mortality due to epidemics or other adverse external living conditions. However, the accumulation of infant deaths in a family depends also on maternal quality. We suppose that maternal quality is more variable in 2nd marriages than in 1st marriages. Our aim is to determine maternal quality by measuring the variation and the concentration of clustering. Methods: We used the historical populations of Krummhoern (KH) [East-Frisa; 1720-1824] and Quebec (QUE) [Canada; 1670-1750]. The populations differ regarding fertility and mortality. QUE is naturally fertile (10 to 11 children in complete families), while fertility in KH is much lower (4 to 5 children in complete families). After data selection there remain 1420 women in KH and 7105 in QUE. We used Lorentz curves and developed a new index to assess death clustering and concentration, the Uniform Contribution Number  $\sum$  (UCN). UCN is given by the inverse of the sum of squared frequencies, where a frequency  $f$  is the proportion of infant deaths coming from a specific woman ( $UCN=1/\sum f^2$ ). Results: The KH overall concentration of death clustering is much higher than in QUE. In QUE we found a slightly increased concentration in 2nd marriages. But we found no clustering effect between 1st and 2nd marriages in KH. Conclusion: The higher overall concentration in KH is partly due to the lower fertility and infant mortality rate which in turn results in a higher amount of women who don't lose any child during infancy. As expected in QUE we found that women in 2nd marriages have a higher concentration of infant deaths than in 1st marriages. We discuss whether we miss this clustering effect in KH due to a general selection for rather high quality mothers.

## Plenary Lecture

### **The crocodile is substantially greener than it is long: about the current status of attractiveness research in evolutionary psychology**

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Humans tend to judge and sort parts of their social and non-social environment permanently into a few basic categories: those parts they like and those parts they don't. Indeed we have developed aesthetic preferences for those things and people we are exposed to. And, needless to say, these preferences shape our behavioural choices - our tendency to seek out or avoid what the world has to offer to us. Humans and other animals have evolved preferences for food and habitats, for naturally occurring sensations like smells and sounds, as well as for the broad array of culturally created artefacts. Humans have evolved aesthetic preferences for their sexual and social companions. I will review the current approaches in attractiveness research, and deal with the human obsession about beauty, and the biological constraints that create the bases for beauty traits as honest mating signals. Unfortunately, although there is a lot of research in this direction, the nature of attractive signals is almost unknown – we usually find that face or bodies are attractive, but the why question is rarely posed. Moreover, if evolutionary approaches to beauty are correct, beauty signals should have a direct relation to health, and reproductive success. I will propose a perceptive model which is based on biologically based construction rules for “what is beautiful” and not on the content of the signals themselves. These construction rules can be modified by several constraints like female cycle, socioeconomic status or self-perception – which makes beauty perception a plastic concept which is able to adapt to a row of socioeconomic situations and environments. In a final part I will present evidence on how beauty traits can influence reproductive success in a rural population on how it might be modulated by cultural factors.

## Session D) Mating Strategies

### **Mate Choice and Health: Effects of own and spouse's characteristics on health estimation and susceptibility to diseases in men and women**

*Martin Fieder<sup>1</sup> and Susanne Huber<sup>2</sup>*

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<sup>2</sup>Research Institut for Wildlife Ecology, Veterinary University of Vienna, Austria, Vienna, Austria

Objective: Individual characteristics such as age, body size, and socio-economic status are known to affect both a person's health and health estimation. Whether such characteristics of a person's spouse exert a similar effect, however, is largely unknown. Methods: We analysed a sample of 268.202 married US-couples, obtained from the Integrated Health Interview Series? (IHIS) of the years 1982-2003, to examine separately for men and women, whether an individual's self estimation of health and susceptibility to certain diseases is associated with the individual's own as well as its spouse's age, height, income, and education. Results: We found in men and in women, that self estimation of health, as well as to a certain degree also susceptibility to infectious diseases and cardiovascular disease, are associated both with own as well as spouse's characteristics. Generally, in both sexes, health estimation decreased and vulnerability to these diseases increased with age, whereas health estimation increased but susceptibility decreased with body height and income, education showing a non-linear association. While spouse's characteristics were more important for a woman's health rating than her own, in men, apart from spouse's age, only own characteristics had a significant effect. Conclusion: Our results indicate that in women, mate selection along criteria predicted by evolutionary psychology may improve both health and health feeling, whereas in men, own characteristics appear to be more important.

**Mother knows best: revisiting the paternity threshold model**

*Laura Fortunato*<sup>1</sup> and *Marco Archetti*<sup>2</sup>

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<sup>2</sup>Department of Organismic and Evolutionary Biology, Harvard University, USA, Harvard, USA

**Objective:** If a man has a low probability of being the biological father of his wife's children, he may be better off investing in his sister's: relatedness to a sister is always certain (through one's mother), as is relatedness to her offspring. On this notion, the paternity threshold model sets at 0.268 the level of paternity below which a man is better off investing in his sister's offspring, rather than in his wife's. Yet this threshold seems unrealistically low, making matrilineal inheritance an unlikely evolutionary outcome. **Methods:** We develop a game-theoretic model to investigate how the value of the paternity threshold is affected by the inclusion of different male and female marriage strategies and of strategic female behaviour (i.e. the strategic allocation of paternity contingent on the level of male investment in the female's offspring). Additionally, we investigate the effect of varying subsistence systems on the stability of inheritance strategies. **Results:** We show that matrilineal inheritance is stable under a range of paternity levels, where the level of paternity is the outcome of the complex interaction of male and female marriage strategies with female paternity strategy, coupled with the effect of the subsistence system. Specifically, matrilineal inheritance is stable for levels of paternity greater than the 0.268 threshold where males are polygynous and where the relationship between inherited resources and fitness is non-linear, indicating increasing or decreasing returns to scale. **Conclusion:** Results show that matrilineal inheritance represents a likely evolutionary outcome within the framework of inclusive fitness theory. We discuss previous anthropological observations on the history and cross-cultural distribution of this practice in the context of the model, and briefly outline specific predictions to be tested against the archaeological, historical, and ethnographic data.

## Session E) Preferences and Constraints in Mating

### Similarities and differences between partner height preferences and actual partner heights

*Gert Stulp<sup>1</sup>, Thomas V. Pollet<sup>2</sup>, Simon Verhulst<sup>2</sup>, Daniel Nettle<sup>3</sup> and Abraham P. Buunk<sup>4</sup>*

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Objective: Preferences for partner height have been argued to emerge from several (not necessarily mutually exclusive) heuristics: assortative mating, the male-taller norm and the male-not-too-tall norm. In addition, the preferred partner height difference is dependent on one's own height: short women prefer larger partner height differences than tall women (vice versa for men). We examined to what extent lab-based preferences for height are realised in real couples. Methods: We compared the distribution of actual couple heights (N=10,502) observed in the Millennium Cohort Study (UK) with the distribution expected when mating is random with respect to height. Results: Assortative mating existed, as the heights between partners correlated ( $r=0.18$ ). Furthermore, both the male-taller norm, and the male-not-too-tall norm existed, as couples in which the male partner was shorter, or over 20 cm taller than the female partner occurred less often in the actual couples compared to random mating. Couples in which the partner was 5-15 cm taller occurred more often compared to random mating. The difference in height with one's partner was a function of one's own height. Contrary to studies on mate preferences, short women were relatively more likely to have only a small height difference with their partner, whereas tall women were relatively more likely to have a large difference with their partner (vice versa for men). Conclusion: We find that partner height preferences, namely assortative mating, the male-taller norm, and the male-not-too tall norm, are sufficiently important in mate choice that they are apparent in real couples in a UK population. The discrepancies we found between studies on partner height preferences and our findings on actual partner heights are discussed. We propose a new functional hypothesis for the existence of the male-not-too-tall norm: having a relatively tall male partner increases the risk of birth complications.

## **Men's and Women's Sexual Interest and Actual Sexual Behavior as a Function of both the Participant's and the Partners' Ages**

*Jan Antfolk, Salo Benny and Katarina Alanko*

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Objective: Women's fertility is associated with their age, fertility peaking at about 25 years of age and then declining towards menopause (REF) while men's age is not to the same degree associated with fertility. Thus women are expected to be more flexible in terms of their partner's age, so as to, on average, prefer men similar to themselves in age, while men are expected to be more rigid in their sexual interest and independently of their own age prefer women in their most fertile age. Men's actual sexual behavior, however, is restricted by women's sexuality, and thus for men an asymmetry between the ages of the objects' of sexual interest and ages the partners' with whom they have sexual behavior is expected, and further that this asymmetry increases as a function of the men's own age. Methods: In order to investigate these patterns, we surveyed a sample of 4,445 men and 8,211 women between ages 18 and 49. Subjects reported the ages of their objects of sexual interest and ages of the partners with whom they had sexual behavior with during the last year. Results: We found that women over their lifespan have sexual interest and sexual behavior with men similar to themselves in age. Men, however, were found to have sex with women matching their own age, while their sexual interest is more directed towards the age of peak fertility in women. This asymmetry was found to increase as a function of men's age. Conclusion: To our knowledge, this is the only study in which a large and representative sample of men and women has been studied for both sexual interest and actual sexual behavior as a function of both the participant's and the partner's ages. Our findings are in line with predictions derived from evolutionary theory.

**Testosterone levels are positively associated with the lifetime number of opposite sex partners in a large sample of elderly American men.**

*Kelly D. Cobey<sup>1</sup>, Leander van der Meij<sup>1,2</sup>, Abraham P. Buunk<sup>1</sup> and Thomas V. Pollet<sup>1</sup>*

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Objective: Testosterone (T) has been argued to modulate mating and parenting behavior in many species, including humans. The role of T for these behaviors has been framed as the challenge hypothesis. In line with this hypothesis, research in humans has shown that T is related to the number of opposite sex partners a man has (though these data are typically from small and non-representative samples). We test whether the relationship between T and sex partners extends to the lifetime number of sex partners a male has. Methods: Data are from a study covering ageing in the US (NSHAP: <http://www.norc.org/nshap>; working sample= 749 men; Mean age= 68.8 years). Following a generalized linear mixed modeling approach, we test whether T is positively associated with reported opposite sex partners. Hormone assays were collected via saliva and analyzed via standardized procedures. Our key dependent variable is the reported number of opposite sex partners (In your entire life so far, about how many women have you had sex with, even if only one time??). As control variables, we included educational attainment, ethnicity, age, BMI, time of sampling and use of medications which influence T. Results: T is positively associated with the number of opposite sex partners in a generalized linear mixed model ( $I^2 = .128$ ;  $t(740)=3.16$ ;  $p=.002$ ). This positive effect of T was found while controlling for the potential confounds listed above. Drastic overreporting could also be ruled out: the effect of T was found regardless of limiting the sample to a 100, 50, 20, 10 or even 5 opposite sex partners (all  $I^2$  s  $> .08$ ; all  $p$ 's  $< .009$ ). Conclusion: T is robustly and positively associated with the number of opposite sex partners a male reports. Results are discussed with reference to the literature on T and sex partners and more broadly the challenge hypothesis.

**What room for choice in mutual mate choice?**

*Alexandre Courtiol*

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**Objective:** Despite the distinction between mating preferences and actual pairings to mate, these two concepts are often confused under the label mate choice. Such a distinction is not a trivial matter and it might challenge interpretations of studies in fields such as evolutionary psychology, demography, or evolutionary biology. Investigations of the link between mating preferences and mating patterns are however currently lacking, and previous studies on mating preferences have often overlooked the consequences of the fact that both men and women show mating preferences. **Methods:** To illustrate the distinction between mating preferences and mating patterns, as well as their consequences, I will present two empirical studies: one which examined whether assortative mating patterns documented for height are a consequence of mating preferences, and another which measured mating preferences for height, mass and BMI and compared these preferences to the actual characteristics of the partners. **Results:** The two studies exemplify an almost unavoidable consequence of mutual mate choices: mating preferences expressed by males differ from those of females in a way which precludes pair formation of couples for which preferences of both partners would be simultaneously satisfied. Consequently, asymmetries between sexes arise. Here, the tug of war seems to favour males but this situation can counter-intuitively be predicted by models assuming that women and not men control mating decisions. **Conclusion:** All is not for the best in not the best of all possible worlds, and predicting the outcome of mutual mate choices is difficult. Yet, I will suggest how building a bridge between the economic and biological views of mate choice could provide significant insights to better understand the complex process of pair formation.

## Plenary Lecture

### The Case for Cultural Group Selection

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Robert Boyd and I have long argued that group selection on culturally transmitted variation has been an important force in gene-cultural coevolution, particularly in the evolution of human “social instincts.” This argument remains controversial. I will review the evidence that three forms of group selection act on cultural variation, differential extinction and proliferation of social organizations, selective borrowing from successful organizations, and selective immigration into successful organizations. The main empirical plank of the case for cultural group selection is that the proximal details of cultural inheritance make it much easier for microevolutionary processes to build up and maintain variation between organizations than is the case for genetic inheritance. Consistent with theoretical models of the generation of intergroup variation in the two cases, cultural variation between neighboring ethnic groups is about ten times genetic variation between the same groups. In many cases, organizations institutionalize social behavior, meaning that people are expected to conform to rules of behavior that are reinforced by systems of reward and punishment. Institutions suppress individual variation within organizations. Different organizations tend to evolve different institutions, generating equilibrium selection when they compete. Almost any system of organizations is potentially subject to cultural group selection. Competing business firms in capitalist economies are a famous example. Evolutionary genomics has greatly increased our confidence that culture can drive the evolution of genes. The best worked out alternative to group selection on cultural variation and subsequent gene-culture coevolution to explain human abilities to form cooperative organizations is the indirect reciprocity argument in which social intelligent actors using tools such as reputation and punishment to enforce cooperation. But social intelligence, reputation and altruistic punishment are equally plausibly an ultimate result of cultural group selection.

## Session F1) Cultural Evolution

### Specialization: A Driving Force in Cultural Evolution – Theory and Data

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Objective: Many species utilize division of labor and specialization, but to a varying extent, from the basic division between genders to the complex specialization found in ant colonies. Human specialization is unique in that it is culturally, rather than genetically determined. Instead of genetic differences, we specialize by distributing knowledge between individuals, which allows even more diversity and this diversity is accelerating. This makes specialization a very important part of cultural evolution. Specialization has already been studied extensively within economy, biology and several other fields. We therefore set out to analyze previous results from a cultural evolution point of view and to build a framework for studying the origin and the evolution of the cultural specialization. Methods: We have compiled theories and data from different fields as well as conducted an empirical study of the number of professions in Sweden during the 19th century. We have developed novel mathematical models to allow formal examination of proposed theories and validation against data. Results: Data show a clear correlation between societal development and the amount of specialization. The order in which specialists appear seems to be consistent across different civilizations. Many of the early specializations are tied to religious duties rather than sustenance. The order in which specializations occur does not seem to depend on how difficult it is to learn the associated task. Conclusion: Specialization is an integral part of cultural evolution, both a driver and an outcome of other aspects of cultural change. Cultural evolution drives specialization since more knowledge means higher learning costs, eventually making specialization necessary. At the same time, our models indicate that specialization increases innovation rate, creating a ratcheting effect. We will offer some speculation on the reasons that culturally determined specialization appear only in humans.

## **Group markers and cultural diversity in experimental microsocieties**

*Cristina Matthews, Christine A. Caldwell and Gareth Roberts*

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**Objective:** Previous studies have examined the conditions under which design traditions emerge in laboratory-controlled microsocieties in cultural transmission chains (Caldwell and Millen, 2008, *Phil Trans R Soc B*). The aim of this study is to determine whether a situation encouraging ingroup favouritism can lead to the cultural evolution of social markers of group identity. **Methods:** Four teams took part in the experiment concurrently, and each generation of a team had four participants. In the first session, participants built a tower using spaghetti and modelling clay. While building their own tower, they were shown the four towers built by participants of the previous generation of their team. It was explained to them that, in the second session, all participants would try to select towers belonging to their teammates from amongst a set of towers. Participants were rewarded both when they correctly selected a teammate's tower, and when their own tower was selected by a teammate. **Results:** In the final generation towers belonging to the same team were rated as being more similar to each other than to towers belonging to other teams. Participants' success at recognising towers from their own team also increased over generations. **Conclusion:** Pressure for ingroup favouritism can create within-group convergence based on the replication of aspects of previous designs. In this experiment, participants did not see towers from opponent teams until after they had built their own towers, so positive cultural models were clear, but negative cultural models were absent. Direct contact at the building stage with towers from opponent teams is expected to amplify between-group divergence. However, even in the absence of negative cultural models, there was divergence between groups.

## **Session F2) Cooperation: Assortment**

### **Assortment and repetition: a recipe for cooperation**

*Julian Garcia<sup>1</sup> and Matthijs van Veelen<sup>2</sup>*

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Economists have often devoted attention to repetition as a means to explain cooperation. Biologists, on the other hand, seem to have stressed the role of population structure. Here we combine these two mechanisms in order to understand how they interact and complement each other. We propose a model with two main parameters: continuation probability in a repeated game, and level of assortment of the population structure. By analysing pair-wise stability in a restricted strategy set we were able to classify the parameter space of the model into four regions. Each corresponds to a different predicted level of cooperation. Using computer simulations we show that this result also holds for an infinitely large unbounded strategy set. We show that in the presence of repetition, a marginal change in assortment goes a long way in promoting cooperative behavior.

## **An approach to studying cooperation between kin**

*Patrick Heady*

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Objective: To assess evolutionary and other theories of cooperation between relatives - looking particularly at altruism and various kinds of reciprocity. As kinship ties connect known individuals, anonymous cooperation games are not ideal for this purpose. For KASS, a comparative project on European kinship ties, we developed an alternative approach. Methods: The approach involves recording actual interactions with kin and other important partners. The interviewer uses a computerised questionnaire to elicit a systematic account of the informant's network of known relatives by descent and marriage. S/he then asks about practical cooperation and social interactions between the informant and the members of this network - and with other close cooperators. The resulting data can be used to provide quantitative tests of alternative theories of cooperation. Results: Hamiltonian predictions of kin altruism are well supported. Direct reciprocity between relatives is also an important factor (though more flexible than with non-relatives). We found no evidence of altruistic punishment, but there was evidence of contextual and cultural differences. Conclusion: This data format has the advantage that it can be combined with ethnography and used to assess evolutionary and cultural theories using the same data. The results presented here clearly require replication - ideally in different geographical and cultural settings.

## Session G1) Kin and Reproduction

### **Reproductive strategies under socioeconomic constraints: Modelling effects of Krummhörn grandmothers on fertility decisions of their daughters and daughters-in-law (18th and 19th centuries, Germany)**

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Objective: Effects of maternal and paternal grandmothers (MGMs and PGMs) on maternal fertility are expected to differ. This study makes use of birth schedules within historical records provided by the family reconstitution study of the Krummhörn in East Frisia. Taking into account the various socioeconomic conditions prevalent in this historical population, it has been investigated, whether the presence of the MGM or the PGM in a family's parish at that time correlates with the maternal age at first birth (AFB), subsequent interbirth intervals (IBIs), and parity progression ratios (PPRs). Methods: Cox and Aalen models were used to model AFB and IBIs. PPRs were modeled using mixed effects logistic regression. In all cases, cohort effects have been controlled for. Presence of the MGM or PGM, socioeconomic status of the family's household as well as their interaction effects were included as main predictors. Results: Only for the economically constrained landless people, the MGM's presence correlates positively with her daughter's fertility (higher PPRs, lower AFB). The opposite is found for farmers benefiting from big landownership (i. e. MGM's presence correlates negatively with her daughter's fertility). It is important to mention that farmer families in general can be characterised by increased fertility compared to landless families. Conclusions: Reproduction can both be supported or hindered by elder women. The presented conditional MGM effects strengthen the assumption that mothers are more beneficial to their daughters than their daughters-in-law. Depending on the socioeconomic conditions prevalent in historical Krummhörn, MGMs can be advantageous either by giving their daughters an opportunity for earlier reproduction thus increasing fertility (as in landless families) or by protecting them from their mate's sometimes excessive fertility goals (as in wealthy farmer families).

## **What If Romeo and Juliet Had Listened to Their Parents? An Agent-Based Model of Parental Involvement in Human Mate Choice**

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Models of human mate choice have assumed that young men and women evaluate and choose their own marriage partners. For most of human history, however, marriage decisions have been made, at least in part, by families and not the individuals married. In contemporary small scale societies and populations that industrialized more recently, families continue to play a role in arranging marriages. Members of the wider family gain in fitness if they help relatives of reproductive age to marry well and successfully raise children. And it is common for reproductive age couples to rely on this help. Limited experience and incomplete brain development may lead young people to make short-sighted mating decisions. Involving the older generation may be a useful heuristic for dealing with bounded rationality. We present an evolutionary agent-based model (ABM) of mate choice in which individuals vary in both their genetic quality, (which is linked to their ability to gain the resources necessary to produce offspring) and cooperativeness (their tendency to share resources with other family members). Families and marriageable individuals both contribute to mate choice decisions with both parties varying on the weight they give to genetic quality versus cooperativeness. Whether or not two marriageable individuals marry is a mutual decision weighted by family and marriageable individual level interests. Thus, our ABM examines the role of parental/family choice based on intra-family cooperation and individual level choices based on perceived genetic quality. Our model allows for selfishness and high-genetic quality to co-evolve and we systematically analyze this model to determine conditions under which family vs. marriageable individual decision making components dominate. This research provides valuable insights into the evolution of cooperativeness and the implications of the modern cultural trend toward excluding parents involvement in mating decisions.

## **Are elder siblings helpers or competitors? Long-term fitness effects of sibling interactions in a Finnish population.**

*Aida Nitsch*<sup>1</sup>, *Charlotte Faurie*<sup>2</sup> and *Virpi Lummaa*<sup>1</sup>

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**Objective.** Determining the fitness consequences of sibling interactions is pivotal for understanding the evolution of human family. Theory suggests that both competition and cooperation with other siblings could lead to maximization of individual fitness, but the benefits of each strategy may depend on several factors such as individual age, sex, family size or birth order. Although these two types of interactions imply opposite effects on fitness of other siblings, studies investigating both hypotheses simultaneously over the whole lifespan of individuals and using long-term fitness measures are lacking. **Methods.** We used a large (n=20,000) demographic dataset from preindustrial Finland to study both the positive and negative effects of elder siblings on key life-history traits of younger siblings across different ages, including: survival during childhood and indicators of lifetime reproductive success (probability of reproducing, number of children and proportion of children raised to adulthood). **Results.** We found that the presence of both elder brothers and sisters improved the relative survival of their younger siblings during childhood. However, for both men and women in adulthood, having elder siblings was associated with reduced reproductive success among the same-sexed younger siblings. **Conclusion.** Our results suggest that despite a global competition for resources during childhood, elder siblings may cooperate with their younger siblings during this period. Our results also indicate competition among same-sexed siblings for resources such as mating opportunities once individuals have reached sexual maturity. This study is one of the first showing that individuals could have opposing effects on the success of their younger siblings depending on their life-history stage, and highlight the need for using long-term measures of fitness before concluding on the selection pressures on sibling interactions.

## How do kin impact reproduction? A comparison of kin support and kin influence models

*Curtis Atkisson<sup>1</sup>, Mary K. Shenk<sup>1</sup> and Mary C. Towner<sup>2</sup>*

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Objective: Evolutionary biologists agree that kin can have profound effects on reproductive decisions, including demographic transitions, yet the mechanisms underlying kin effects are difficult to tease apart. Turke (1979) proposes that demographic transitions are caused in part by a reduction in the number of kin who help mothers with childrearing, forcing women to reduce the number of offspring they bear or invest in. Newson (2005), in contrast, proposes a cultural evolutionary model suggesting that fertility reduction is related to a reduced frequency of interaction with kin caused by education outside the home, neolocal residence, and other aspects of modern life. Although these models postulate different mechanisms for kin effects on fertility, they yield very similar predictions making it challenging to discriminate between them analytically. This paper disentangles these theories using unusually detailed contextual variables and model selection methods. Methods: Our analysis uses recently collected survey data from rural Bangladesh including data on household composition, distance between natal and marital households, numbers and genders of extended kin, and kin migration. These detailed contextual variables allow creation of predictors that discriminate between Newson and Turke. We perform regression analyses using GLM, modeling fertility using a Poisson distribution, and use model selection criteria and effect sizes to determine the relative evidence the data provide for each model. Results: Turke's model receives greater support from the data than does Newson's, yet we find that models containing variables from both models receive the strongest support overall. Conclusion: Our results suggest that humans take account of multiple types of information about kin when making fertility decisions, including the availability of help as well as influence that may be conveyed through kin interactions. Our data also suggest that the calculus of human fertility decisions may rely more heavily on information about instrumental support than kin influence.

## Session G2) Cultural Transmission

### **An experimental comparison of human social learning strategies: payoff-biased social learning is adaptive but under-used**

*Alex Mesoudi*

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**Objective:** Analytical models have identified a range of social learning strategies that are predicted to be adaptive relative to individual learning. Yet there is limited experimental evidence regarding which of these strategies people actually employ, and whether their choices reflect model predictions. This study aimed to determine people's choices of social learning strategy using a complex task representative of real-world technological change. **Methods:** Participants designed virtual arrowheads composed of multiple characters (e.g. height, thickness), with fitness determined by a multimodal adaptive landscape. On each trial, participants could engage in (i) individual learning (ii) payoff-bias, copying the most successful group member (iii) conformity, copying the most common character values of the group (iv) averaging, copying the mean values of the group, or (v) random copying, copying a randomly chosen group member. **Results:** Participants exhibited mostly individual learning (77.5% of trials), some payoff bias (18.8% of trials), and negligible frequencies of the other strategies. Consistent with modeling predictions, frequency of payoff bias was the only strategy to significantly predict performance. This was driven by a minority (12.5%) of participants who exhibited high levels of payoff bias, relative to the majority of participants who engaged in individual learning. Interestingly, the minority of social learners were also significantly better individual learners. **Conclusion:** While the prediction that people should employ the adaptive payoff-biased social learning strategy in preference to other social learning strategies was supported, payoff bias was still under-used relative to individual learning. Reasons for this mismatch will be discussed.

## **The establishment of arbitrary symbolic communicative conventions in experimental microsocieties**

*Christine A. Caldwell*

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Objective: In previous work (Caldwell and Millen, 2008, *Evol Hum Behav*), using simple building tasks, cumulative cultural evolution within experimental microsocieties was accompanied by increasing similarity across groups, as later generations converged on similar (successful) designs. The current study made use of a communicative task. Improved performance over generations was expected, consistent with cumulative effects identified in previous studies. However, it was also expected that these improvements would be associated with divergence between groups, as opposed to convergence, due to the establishment of arbitrary symbolic communicative conventions. Methods: Sixteen chains each consisting of ten participants were run. The task used was an interactive graphical communication task (similar to that used by Garrod et al., 2007, *Cog Sci*). A replacement microsociety design was used. Results: Trial times reduced over generations, consistent with improving performance on the task. In later generations, experienced guessers showed a high level of accuracy when guessing the meaning of drawings by members of their own group but were far less accurate when guessing the meaning of drawings produced by later generation drawers from other groups, consistent with the establishment of arbitrary symbolic communicative conventions. Conclusion: The results suggest that where symbolic traditions are concerned (which are necessarily arbitrary in form, and established by convention) cumulative cultural evolution is likely to generate between group divergence, and mutual incomprehensibility of conventional meanings. Consequently, cumulative culture will not inevitably be associated with convergence over generations.

## Cultural transmission of preferences creates fashions and fads

*Alberto Acerbi*<sup>1</sup>, *Stefano Ghirlanda*<sup>2</sup> and *Magnus Enquist*<sup>1,3</sup>

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**Objective:** While some cultural traits once introduced in a population tend to become stable part of its cultural repertoire, others exhibit peculiar volatile dynamics, commonly dubbed fads or fashions. Such fluctuations in popularity are not mainly due to intrinsic characteristics of the traits (i.e. there is nothing intrinsically advantageous in wearing a miniskirt in the 60's that became disadvantageous in, say, the 90's) but they are likely to reflect forces that are auto generated in cultural dynamics. Here we propose a model of fads and fashion based on the assumption that cultural dynamics are influenced both by the traits bore by individuals and by the preferences for those traits, that can also be culturally transmitted. **Methods:** We analyze the results of an individual based model of the coevolution between cultural traits and preferences as well as the results of two alternative models (the random model, where individuals randomly copy each other, and the status model, where the decision to copy is influenced by individuals' status) and compare them with different empirical datasets. **Results:** We show that, in our model, realistic fashion-like dynamics emerges spontaneously during cultural evolution. We show that the outcomes reproduce empirical distributions of the frequency and lifespan of cultural traits (most traits are adopted by few individuals for a short time, and very few by many for a long time), as well as the finding that traits that increase rapidly in popularity are also abandoned quickly. We also establish that the alternative models do not satisfactorily reproduce these observations. **Conclusion:** Our results show that fashions are an essential feature of cultural dynamics, driven by the cultural transmission of preferences and not by social stratification or chance.

**Trait stickiness in cumulative cultural evolution depends on accuracy of individual information.**

*Ulf Toelch<sup>1</sup>, Peter J. Richerson<sup>2</sup>, Simon M. Reader<sup>3</sup>, Lesley Newson<sup>4</sup>,  
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**Objective:** The diffusion of innovations depends strongly on social learning processes that influence which novel traits are copied and incorporated in the repertoire of a population. Social learning thus impacts on cumulative cultural evolution (CCE) via various transmission biases. Our understanding of social learning has so far mainly focused on the decision. That is, which trait individuals choose from a set of options. CCE is, however, a dynamic process in which individuals replace acquired traits with new or modified traits. How sustainably a trait is incorporated into individuals' repertoires hinges on how confident individuals are about their choice. In this experiment we investigated the influence of two important context dependent variables on choice confidence of participants (n=90) in a social learning paradigm; accuracy of individual information and whether social information conflicted with individual information. **Methods:** Participants played an investment game with investment and decision latency operationalised as measures for choice confidence. Moreover, we retested the same participants several days later in an established social learning game that involved agricultural planting decisions to test for context independence of social information use. **Results:** We found a decrease in confidence when individual accuracy was low or social information conflicted with individual information. Moreover, a correlational analysis revealed that our psychological construct of social information use tested in the two games had similar magnitudes within-subjects but substantial differences between subjects. **Conclusion:** Our findings spread new light on diffusion dynamics in CCE as we identified factors that facilitate different levels of confidence in a social learning context. These will directly influence the probability that a current trait is retained, how sticky it is.

## Plenary Lecture

### The climate change game

*Manfred Milinski*

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The Intergovernmental Panel on Climate Change published its report in 2007, saying that to reduce the risk of dangerous climate change, global greenhouse gas emissions should be reduced to about 50 % of the present level by 2050. Failure to accomplish this reduction may well incur dangerous climate change later, resulting in substantial human, ecological, and economic losses. The Copenhagen climate summit 2009 ended without a binding agreement among unequal players. We simulated the essential features of the climate change game in a “nutshell”: Will a group of 6 students reach a fixed target sum through successive individual monetary contributions, when they know they will lose the larger part of their money if the group fails to reach the target sum? “Poor” players were provided with less money than “rich” players. The students received in cash all the money that they did not spend and a further sum that they would rescue, if the group invested the target sum. Groups consisted of only poor, only rich or 3 poor and 3 rich players. Will rich players invest more and poor players less in the mix than when among themselves? In mixed groups the rich often failed to invest enough to reach a final collective target that simulates the prevention of dangerous climate change. This failure occurred despite severe monetary consequences and ample means of prevention. Surprisingly, reaching an additional intermediate collective target easily prevented additional intermediate climate risks. Now, the rich substituted for missing contributions by the poor provided that climate risks and climate change mitigation planning have similar, intermediate time horizons, which should be an essential component of successful climate negotiations.

## Session H) Game Theory

### Experimental evidence of the reversed observer effect in the human corporation.

*Kengo Tane and Masanori Takezawa*

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Objective: Haley and Fessler (2005) found that illustrations of the human face make people more cooperative in the dictator game. While trying to replicate this observer effect under the more manipulated anonymous situation than the original study, we found the same illustration made people act more selfishly. In this presentation, we report this surprising result. Methods: We replicated Haley and Fessler (2005) under strict anonymity. Participants were invited in a dark sound-proof room and instructed that all the instructions would be displayed on the PC monitor thereafter and left alone. Participants received the 10 pieces of lottery placed on the desk, which expected value was 1000 (= 9 Euros) in total, and put as many lotteries as they want to give to the other unknown player into an envelope. They then left a sealed-envelope into a transparent box which was filled with similar sealed-envelopes so that they were sure nobody knows how many lotteries they kept for themselves and because of the reward was lottery, this information was kept secret when receiving the winning money. Results: We conducted two experiments where the time presenting faces and type of neutral stimulus displayed in the control condition were varied. In both experiments, a face illustration did not increase the money given to a receiver. 2 (face/neutral) x 2(male/female) ANOVA performed on the collapsed data showed the main effect of face was marginally significant ( $p = .057$ ); participants gave less lotteries in the Face condition ( $M=2.83$ ) than in the control condition ( $M = 3.40$ ). Conclusion: One possible explanation of the reversed observer effect is the degree of anonymity. We completely deprived of the feeling of the others and established stricter anonymity in a laboratory than any other studies. We discuss why the degree of anonymity results in the reversed observer effect.

## **Alternative roles of punishment in experimental settings: Beside strong reciprocity**

*Tünde Paál and Tamas Bereczkei*

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**Objectives:** Strong negative reciprocity, sanctions imposed on norm violators on the punisher's own expense, has powerful cooperation-enhancing effects in both real-life and experimental game situations. However, it is plausible that punishment may obtain alternative roles depending on social context and personality characteristics. We examined the occurrence of punishing behavior among subjects with different levels of Machiavellianism in a strongly competitive game setting. **Methods:** 80 undergraduates participated in an anonymous, 10-round Public Goods game with costly punishment condition from round 6 to 10. Participants received fees of different pre-fixed amounts based on their final rank in the game. The level of Machiavellianism was assessed by the Mach IV-Questionnaire of Christie and Geis. **Results:** Despite the punishment condition, the amount of contributions decreased steadily during the game. High-Mach subjects contributed significantly less to the common account and received significantly more punishment than Low-Machs. High-Machs also imposed more punishment on others than Low-Mach subjects. At the beginning of the punishment stage High-Machs had significantly more money on their private accounts than Low-Machs. Due to the combined costs of received and imposed punishment, this difference disappeared by the final round. There were no connections between the level of Machiavellianism and the final rank. **Conclusions:** The results indicate that social context (intensive competition) and personality characteristics (Machiavellianism) both exert modifying effects on the role punishment takes. Here, High-Mach subjects punished each other in order to achieve a financially better outcome. Thus, in certain social conditions, punishment primarily functioned as a means of rivalry, instead of a way of second-order cooperation, as strong reciprocity suggests. This raises the need for the possible re-interpretation of strong reciprocity theory.

## Session I) Social Learning

### The Evolutionary Basis of Human Social Learning

*T. J. H. Morgan<sup>1</sup>, L. E. Rendell<sup>1</sup>, M. Ehn<sup>2</sup> and Kevin N. Laland<sup>1</sup>*

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**Objective:** We present a series of experiments examining factors affecting when and how humans use social information provided by others (henceforth 'demonstrators') and to determine whether these factors are consistent with theory suggesting natural selection should favour adaptive social learning strategies. **Methods:** Across four computer-based experiments, a total of 255 subjects took part in six tasks; a foraging task, a mental-rotation task, a length-estimation task and three different audio tasks. They were provided with asocial information through direct access to the task, as well as social information concerning the decisions of demonstrators. We varied demonstrator number and consensus, the cost of asocial information, whether subjects were informed of this cost and task difficulty and recorded subjects' decisions and confidence, costs they incurred and the performance rankings of subjects and demonstrators. **Results:** Demonstrator number and consensus, subject confidence, task difficulty, cost of asocial learning and subject and demonstrator performance all influenced subjects' use of social information, and did so adaptively (i.e. increased payoffs). Significant differences between subjects' use of social information were found and the effects were consistent across experiments. **Conclusion:** Our experiments provide strong support for the deployment of several adaptive social learning strategies, including conformity, payoff based copying, copying when asocial learning is costly and copying when uncertain. We also reveal a strong influence of demonstrator consensus on the likelihood of taking advice. The experiments suggest that human decision making is biased towards adaptive outcomes through implementation of evolved learning rules.

## The Impact on Organisms of Transmitting Secondary Replicator Systems

*Joanna J. Bryson<sup>1</sup> and Sam P. Brown<sup>2</sup>*

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**Objective:** Since Dawkins' (1976) proposal of memetics, there has been considerable discussion of the theoretical viability and consequences of two replicator systems running in parallel exploiting the same vehicles. Microbial biologists have discovered a fully-documentable system of concurrent evolution between host organisms and sub-organismic mobile genetic elements (MGEs) that transmit genetic behavioural instructions between hosts. These genetic instructions are themselves subject to selection both independently and as part of their hosts, and their hosts are subject to selection both with and without these secondary instruction sets. Here we examine the impact on host vehicles of a secondary replicator system. **Methods:** This talk reviews results derived from microbiology concerning the impact on host behaviour of genes carried by MGEs. We are currently developing a better mathematical understanding of the temporal advantages of distributed encoding – it may be that mobile elements allow bacteria to adjust rapidly to environmental variation where that variation is relatively predictable e.g. between greater and lesser concentrations of toxins, feeding opportunities and so forth. **Results:** Contrary to some accounts of memetics, bacterial models indicate that the secondary, communicated evolutionary systems are not necessarily virulent, but can transmit advantage between hosts that compensate for their metabolic costs, primarily by enhancing host cooperation. Importantly from the perspective of Hamilton's rule, by their very transmission (which is sometimes across species), mobile elements increase the relatedness of individuals at the mobile loci controlling cooperative behaviours. **Conclusion:** We believe microbial evidence indicates that second replicator systems are likely to enhance host fitness in some contexts. Of course as with any evolutionary system there is evidence of conflict. For example, some MGEs have evolved addiction mechanisms that makes their expulsion fatal to the host. Conflict though may be the best mechanism for finding an optimum means to exploit an environment.

## Adaptive toolbox of “who” strategies in social learning

*Masanori Takezawa*

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**Objective:** When learning socially, from whom one should learn? In this study, we theoretically investigated when one should use which “who” strategies in social learning (Laland, 2004); imitate-the-most-common (majority strategy) and imitate-the-most-successful (the best member strategy). We found that relative performance of these strategies changes in response to the three key parameters of the social environment. We also show behavioral data that people adaptively select an appropriate “who” strategy in response to the features of the social environment. **Methods:** Hastie and Kameda (2005) systematically compared these two strategies and concluded that the majority strategy outperforms the best member strategy in a wide parameter region. However, in their study, individuals could use only a specific individual decision strategy and values of key parameters were also arbitrarily constrained. Stimulated by their study, we conducted new computer simulations and fully manipulated three key parameters (i.e., average and variance of individual performance distribution and correlation among individual decisions) for thoroughly comparing the performance of the two strategies. **Results:** We found the performance of the majority strategy critically depends on correlations among individual decisions; even a small degree of correlation favored the best member strategy. Even when correlation is very low, the majority strategy is not always the winner but is outperformed by the best member strategy under specific combinations of the two other parameters. **Conclusion:** It is suggested from the current computer simulation that people may adaptively select an appropriate “who” strategy under the current environment in response to several environmental cues. In the presentation, we show some behavioral data supporting the idea that people are especially sensitive to a cue indicating the degree of correlation of decisions and adaptively change from whom they take advice.

## **The interplay between individual learning and social transmission in heterogeneous environments**

*Anne Kandler<sup>1</sup> and Kevin N. Laland<sup>2</sup>*

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**Objective:** Social transmission is a key concept of cultural evolution. We present a mathematical model which explores the relationship between spatially and temporally variable environments and the success of different social transmission strategies. In particular we are interested in understanding the conditions under which conformity (the tendency to disproportionately copy the majority) proves to be a highly effective strategy. **Methods:** We assume different variants (which convey different degrees of benefit to their adopters) of a cultural trait to be present in a spatially structured population. We model the change in the frequency of different variants over time and space as a competition process in which frequencies vary as a function of individual learning, social transmission and between-variant competition. **Results:** We find that in order to make social transmission, and in particular conformist bias, successful in temporally variable environments frequently transmitted variants need to be well-adapted to the current situation. Individual learning could be one mechanism which ensures this and we obtain that populations where both social transmission and individual learning coexist are better adapted to temporally varying environments than populations which rely on social transmission only. Depending on the stability of the environment we determine a critical number of individual learners that is needed to make social learning and in particular conformist bias a successful strategy. It yields: the higher the environmental uncertainty the higher this number must be. **Conclusion:** In temporally changing environments the success of the conformist strategy depends on the fraction of individuals who rely on individual learning. As this fraction needs to be higher for more unstable environments we expect to find only a moderate conformist tendency in the population.

## **New Investigator Award Winner**

### **Communication, cognition, and the origins of language**

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Speaking very broadly, we can identify two different approaches to communication: the code model, in which meaning is fully encoded in the signal, and inferential communication, in which speakers provide evidence for their intended meaning, and listeners use that evidence to infer the speaker's meaning. Probably most animal communication is of the former type, but human linguistic communication is of the latter type. What are the cognitive foundations of this form of communication, how did they evolve, and how does inference affect the way that communication systems emerge through interaction? I will describe recent empirical studies that begin to shed light on these questions.

## Session J1) Face Recognition

### Exposure to visual cues of pathogen contagion changes preferences for masculinity and symmetry in opposite-sex faces

*Anthony Little<sup>1</sup>, Lisa DeBruine<sup>2</sup> and Benedict C. Jones<sup>2</sup>*

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**Objective:** Evolutionary approaches to human attractiveness have documented several traits that are proposed to be attractive across individuals and cultures, although both cross-individual and cross-cultural variations are also often found. Previous studies show that parasite prevalence and mortality/health are related to cultural variation in preferences for attractive traits. We examined whether visual experience of pathogen cues may mediate such variable preferences. **Methods:** We showed individuals slideshows of images with cues to low and high pathogen prevalence and measured their visual preferences for face traits both before and after exposure. **Results:** We found that both men and women moderated their preferences for facial masculinity and symmetry according to recent experience of visual cues to environmental pathogens. Change in preferences was seen mainly for opposite-sex faces with women preferring more masculine and more symmetric male faces and men preferring more feminine and more symmetric female faces after exposure to pathogen cues than when not exposed to such cues. Cues to environmental pathogens had no significant effects on preferences for same-sex faces. **Conclusion:** These data complement studies of cross-cultural differences in attractiveness judgements by suggesting a mechanism for variation in mate preferences. Similar visual experience could lead to within-cultural agreement and differing visual experience could lead to cross-cultural variation. Overall, our data demonstrate that preferences can be strategically flexible according to recent visual experience with pathogen cues. Given that cues to pathogens may signal an increase in contagion/mortality risk, it may be adaptive to shift visual preferences in favour of proposed good-gene markers in environments where such cues are more evident.

## Women prefer faces that resemble their partners

*Tamsin Saxton*<sup>1</sup>, *Bernard Tiddeman*<sup>2</sup> and *Dengke Xiao*<sup>3</sup>

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**Objective:** Many recent studies have sought to investigate the factors that influence facial attractiveness judgments. These studies proceed under the assumption that standard laboratory tests of attractiveness judgments mirror an individual's actual choice of a partner's physical characteristics outside the laboratory. This study tests whether this assumption holds. **Methods:** 14 women were told to change the shape of three-dimensional images of men's faces, using a dedicated software program, to make the faces look as attractive as possible. The women made the changes by moving a slider backwards and forwards. The women were not told that moving the slider made the images look subtly more or less like their partner or another man. **Results:** When instructed to increase the image's attractiveness, the women were significantly more likely to change the face to resemble their partner, particularly if they assessed their partner's characteristics more positively in a separate questionnaire. There was no relationship between the extent to which a woman manipulated the face to resemble her partner and the self-reported number of hours per week that she spent with him, suggesting that the effect might not be due simply to familiarity. **Conclusion:** To our knowledge, these findings are the first demonstration to our knowledge that objective lab-based measurements of facial preferences (using static but rotatable three-dimensional images) strongly reflect objectively-measured real-life choices of a partner's facial characteristics. This provides strong support for the body of literature that has been built upon this assumption.

## Session J2) Cooperation: Dynamics

### Fast and Frugal Algorithms: Error Management in Games

*Elisabeth Oberzaucher and Karl Grammer*

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Error management is a fast and frugal algorithm that allows making adaptive decisions. It is adaptive to avoid costly mistakes by allowing for some cheaper mistakes. Women overestimating the interest of a man risk losing paternal support. Thus it was adaptive for women to shift their assessment of male interest towards a general underestimation (Type II error). Men, on the other hand, risked to miss reproductive opportunities and therefore evolved an error management favoring overestimation of female interest (Type I error). Finger-length ratios are a measure for prenatal androgen concentrations. The lower 2D:4D, the more testosterone and the less estrogen were present in the second trimester of fetal development. In this study we investigated whether the sex difference in error management holds true in contexts unrelated to reproduction, and is related to finger ratio. We carried out an experiment with two different patience games. 200 men and 200 women participated in the study. The subjects were asked whether they thought they could solve the task on presentation and after manipulation. We collected demographic data and measured 2D and 4D. Men tend to overestimate their capability to solve the puzzle before and after manipulation while women tend to underestimate themselves. We investigated the effect of 2D:4D on error management within the sex groups. Men with masculinized 2D:4D show an even more pronounced type I error management. In women the error management is not affected by 2D:4D. In this study we show that sex differences in error management are not limited to the reproductive context. Furthermore, we could link error management to 2D:4D as a measure for prenatal hormone environment. The need of our ancestors to avoid costly errors in mate choice has led to the evolution of cognitive algorithms, which are now employed in the assessment of situations of unknown outcome.

## Group dynamics in public goods games

*Ulrich Frey and Hannes Rusch*

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**Objective:** Public goods games have become one of the standard methodologies to empirically test hypotheses about human decision making in social dilemmasituations (see e.g. Fehr & Gächter 2002; Milinski et al. 2002). However, little is known about the reasons of individual decisions. **Methods:** We use data from various classical PGG-studies (Fehr & Gächter 2002; Andreoni1995; Nikiforakis2008; Nikiforakis & Normann 2008) and our own. **Results:** First, across studies we find that if one subject contributesmost of her endowments to the public good this also increases the commitment of the other subjects significantly. Second, subjects use punishment to be as efficient, or even more efficient in the long run, compared to the baseline treatments. Both results exemplify individual decisions based on the strategies of other participants, context and other cues during the game. This runs contrary to the predictions of rational choice models of individual optimal behavior. **Conclusion:** Subjects frequently do not seem to be pursuing well-defined independent strategies – they orient themselves rather towards the behavior of the group and the structure of the situation. A possible explanation of this effect might come from gene-culture coevolution theory (see e.g. Richerson & Boyd 2005). Here, the prediction is that in situations where peers can serve as source of information on decision-making the observed behavior poses an influential benchmark for individual decisions, no matter if the group acts optimally or not. Moreover, punishment seems to be more efficient in the long run, which is evolutionarily plausible.

## Session K1) Hormonal Variation and Attractiveness

### Body height, testosterone, vocal and facial attractiveness in men

*Indrikis Krams<sup>1</sup>, Sanita Kecko<sup>1</sup>, Ilona Skrinda<sup>1</sup>, Tatjana Krama<sup>1,2</sup> and Markus J. Rantala<sup>1</sup>*

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**Objective:**Recent studies have shown that some parameters of human voice may be reliable indicators of a speaker's physical characteristics. It was found that men with low-frequency formants tend to be older, taller and they have a high level of testosterone. Other studies have demonstrated that humans, like many other animals, have a specialization for assessing fighting ability from visual cues. On the other hand, these studies do not tell much about importance of the body height, which belongs to the most important predictors of sexual attractiveness in men. We carried out an experiment to test whether there is any relationship between facial and vocal attractiveness and the body height. **Methods:**We tape-recorded and photographed 56 young Latvian men. We also measured their height and concentration of testosterone in the blood. Young Latvian women rated the facial and vocal attractiveness of the samples. **Results:**We did not find any relationship between facial attractiveness and body height, and between facial and vocal attractiveness. However, we found a significant negative relationship between vocal attractiveness and body height. **Conclusion:**Although testosterone concentrations did not correlate with the body height, vocal development may be influenced and modified by activation of sex hormones during adolescence. Testosterone promotes bone growth and maturation, which may affect and terminate the body growth. Androgenic effects of testosterone make men more masculine by increasing their secondary sex characteristics. This suggests that vocal masculinity may be negatively related to the body height.

## **Fragrant expectations – Changes of female body odour quality during pregnancy and after the delivery.**

*Pavlina Lenochova and Jan Havlicek*

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**Objective:**Based on knowledge of body odour quality changes during the menstrual cycle (connected with hormonal level fluctuations), a hypothesis of potential quality variation during the pregnancy was proposed recently. From an evolutionary point of view, these changes could have a significant impact on social interactions. The only study that focused on pregnancy and body odour tested its exact chemical composition, no research of possible changes subjectively perceived by other people has been conducted. **Methods:**The aim of our study therefore was to observe how men perceived the body odour of pregnant women (altogether 14 partners of females who had taken part in a study, 43 non-partners). An experimental group (EG) of 29 pregnant women and a control group (CG) of 7 hormonal contraceptive users sampled the body odour 4 times (for EG once in every trimester and once after the delivery, for CG in corresponding time intervals). Consequently, the samples were stored in a freezer until the usage. During the 6 testing sessions the body odour attractiveness and intensity was evaluated. Every session, the whole range of 4 different samples of each woman was tested in one day (within-subject design). **Results:**The GLM analysis (General Linear Model; independent variables “ female (EG/CG) and pregnancy phase, dependent variables “ odour quality parametres) revealed significant quality changes of body odour through the pregnancy ( $p < 0,001$ ), with the attractiveness peak in the 2nd trimester. Surprisingly, neither a difference in rating of partners and non-partners nor an effect in rating of specific female by her partner in a comparison to other males have been found (Liner Mixed Model, Mann Whitney). **Conclusion:**Our results support previous findings that the quality of body odour fluctuates slightly during the pregnancy and after the delivery. Moreover, we have proved that these fluctuations are perceivable by human nose.

**Changes in preferences for MHC-heterozygosity across menstrual cycle**

*Jan Havlicek<sup>1</sup>, Katerina Ptackova<sup>2</sup>, Katerina Vavrova<sup>2</sup> and S. Craig Roberts<sup>3</sup>*

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**Objective:** Products of major histocompatibility complex (MHC) play a key role in the immune system of vertebrates. Prior studies on different vertebrate species show that heterozygosity in MHC genes is linked to more efficient immune system and preferred in mate choice. Results of human studies are ambivalent perhaps due to the effect of modulating factors as reproductive status. Thus, our aim was to test heterozygosity-related preferences in faces, odor and voice across menstrual cycle. **Methods:** Our sample consisted of 51 male and 52 female (23 hormonal contraception users) blood donors; all genotyped in -A, -B and -DR alleles. Odour stimuli, face photos and voice recordings of men were rated for attractiveness in both follicular and luteal phase. **Results:** Unexpectedly, we found general preference for faces and voices of homozygous men, but no differences in odour ratings. Moreover, voices of homozygous males were rated significantly more attractive in follicular phase. Similar shift in follicular phase was found in ratings of homozygous male faces. **Conclusion:** Our results suggest that preferences for heterozygosity can be sensitive to population level of outbreeding or can be a result of preferences for specific combinations of alleles, which are optimal for the actual environment.

## Regional variation in women's masculinity preferences

*Lisa M. DeBruine<sup>1</sup>, Benedict C. Jones<sup>1</sup>, Anthony C. Little<sup>2</sup>, John R. Crawford<sup>1</sup> and Lisa L. M. Welling<sup>3</sup>*

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**Objective:** Regional differences in women's masculinity preferences across 30 countries have been shown to correlate with both measures of health (DeBruine et al., 2010) and indices of male-male violence (Brooks et al., 2010), such that women prefer more masculine male faces in countries with lower health, greater income inequality and higher homicide rates. Here, we present new data from US states testing the relationship between regional differences in women's masculinity preferences and regional differences in health, income inequality, and homicide rate. **Methods:** Masculinity preferences were measured from 8338 women in the USA using established tests of facial masculinity preferences and the average masculinity preference was calculated for each state. Additionally, we calculated a state health index (SHI) for each state using age-adjusted mortality rates owing to illness and disease (i.e. excluding mortality owing to accidents, homicide and suicide). Other measures of regional variation were taken from publicly available statistics. **Results:** In a stepwise regression analysis including SHI, income inequality, fertility rate and wealth as predictors, the best model (fitted to weighted data by forward stepwise regression) includes only an intercept, SHI and no other terms. Repeating this analysis with homicide rate in place of income inequality showed the same pattern of results. Repeating both of these analyses using regression models in which all of the predictors were entered simultaneously using the enter method revealed the same pattern of results; SHI was a better predictor of masculinity preferences than any of the other variables. **Conclusion:** Collectively, these results show that regional variation in health is a considerably better predictor of variation in women's masculinity preferences among US states than income inequality or homicide rate. This result is consistent with trade-off theories of sexual selection.

## **Session K2) Darwinian Medicine: Adaptations and Beyond**

### **How phobia of threatening animals may generalise to other animals**

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**Objective:** Evolutionary approaches to phobia of animals start from the premise that humans have an innate predisposition to fear animals, such as snakes and spiders, that pose a potential threat. There exist, however, many phobias that are associated with animals that pose little threat (e.g., pony). Such phobias are difficult to explain with the evolutionary account. **Methods:** We performed a spectral analysis of 40 images of snakes and spiders and 420 images of all the 21 other animals that are associated with a recognised phobia. We compared their power spectra with that of 1640 images of control animals not associated with phobia. **Results:** We found that the snakes and spiders possessed relatively large contrast energy at mid-range spatial frequencies. Additionally, whereas all other phobia-inducing animals possessed this visual attribute the control animals did not. **Conclusion:** We propose a model in which the human visual system has been selected for its ability to rapidly detect the presence of a snake or spider based on an early and rapid analysis of the power spectrum rather than on a slower object recognition mechanism. Furthermore, we suggest that other animals that happen to possess this power spectrum characteristic may also tend to induce phobia.

## Immune defence and the attractiveness of men's body

*Markus J. Rantala<sup>1</sup>, Tatjana Krama<sup>2</sup> and Indrikis Krams<sup>2</sup>*

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Humans have sexually dimorphic body figure and size, which has been thought to be a result of sexual selection. It has been suggested that male body attractiveness is an indicator of the male quality and the attractiveness would signal the strength of immune defence and the success in male-male competition to choosy females. However, studies testing the association between immune system and the attractiveness of male body have been lacking. We experimentally tested whether the attractiveness of male body is associated with the strength of male immune defence. We photographed 70 young men while wearing underwear and vaccinated them with hepatitis B vaccine, and measured the amount of specific antibodies produced. We found that the men's immune responsiveness (the amount of antibodies produced after vaccination) correlated positively with the attractiveness of their body. We found that taller men had stronger immune responsiveness than shorter ones, while men with high body mass index (BMI) had lower immune responsiveness than leaner men. Thus, the association between height and immune responsiveness was not explained just by men's size. In contrast to the studies that have used computer manipulated pictures, we did find that women's preference for men's bodies would not change with menstrual cycle. The attractiveness of men's bodies was explained by muscularity, body mass index and waist-to-hip ratio when all other variables were controlled for. Our study provides support for the hypothesis that women's preference on men's body might be an adaptation for identifying high-quality mates with strong immune responses.

## **Adaptive Psychopathic traits**

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Objective: Rather than being a maladaptive personality disorder, Mealey (1995) suggested that psychopathy is a frequency-dependent evolutionary adaptation. Psychopaths are characterised as being superficially charming, manipulative, callous and guilt-free (e.g. Cleckley, 1941), and are successful in achieving short-term success in work environment (Babiak and Hare, 2006) and in the mating arena (Jonason et al, 2009). Although, see Ulrich et al. (2008) who found psychopathic traits did not correlate with wealth and success, or success in interpersonal relationships. In this study, psychopathic personality traits were examined in relation to success in car sales, our reasoning being that perhaps psychopaths are successful only in particular environments, such as the car salesroom. Methods: 79 car salesmen in the North-West of England completed the Self-Report Psychopathy Scale-III (SRP-III) (Paulhus, Hemphill and Hare, in press). SRP-III scores were compared with self-reported sales success in the previous month. The self-reported figures were confirmed as correct by the manager of the car showroom. Results: Total SRP-III score, and the sub-scales of Interpersonal Manipulation, Callous Affect and Erratic Life-Style were all positively correlated with sales success. Multiple regression analyses found Interpersonal Manipulation and Erratic Life-Style significantly predicted sales, accounting for 41% of the variability. Younger salesmen were more successful than older ones, although IM and ELS scores were more important than experience for sales. Conclusion: The idea that psychopathic features confer advantage in car sales was supported, providing evidence for evolution of psychopathy as a successful strategy in particular environments.

## **Autism and schizophrenia: adaptations or evolutionary developmental disorders?**

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Objective: Autism and schizophrenia are disorders with different diagnoses and developmental trajectories. This suggests that these disorders have a separate etiology. However, research on imprinted genes suggests that they are genetically related (e.g., Crespi et al., 2010). They may be opposites along a spectrum of social behavior, with under-development in autism and over-development in schizophrenia. In this view, autism may be adaptive for the father of the affected child, and schizophrenia for the mother. This hypothesis has raised a lot of debate without a firm conclusion. The objective of this presentation is to provide a new perspective based on insights from evolutionary developmental biology. Methods: We hypothesize that autism and schizophrenia result from disturbances during early organogenesis. During this embryological stage (in humans from day 20 to day 40 after fertilization), there are many intense interactions between different body parts. This implies that a single mutation or environmental disturbance (e.g., medication, stress) can lead to a wide array of anomalies, including brain deviations. These brain deviations may lead to disorders such as autism or schizophrenia. The expectation that follows from this hypothesis is that autism and schizophrenia co-occur with multiple physical anomalies. We will present a comprehensive literature review that confirms this expectation. Results: Autism and schizophrenia co-occur with physical anomalies that arise during early organogenesis. Conclusion: Autism and schizophrenia are not adaptations; instead, they result from a complex interplay between genetic and developmental factors. This finding is in agreement with polygenic mutation-selection balance theory, which states that polygenic disorders (e.g., autism and schizophrenia) result from rare mutations in one of many genes involved in these disorders. Insights from evolutionary developmental biology can add a developmental perspective to this theory.

## ***POSTER ABSTRACTS***

## Poster 1

### Relationship between voice characteristics and masculinisation in women

*Magdalena Babiszewska, Agnieszka Zelazniewicz, Irmina Sukiennik, Dorota Dengler, Marcin Just, Monika Morawska-Kochman and Boguslaw Pawlowski*

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**Objective:** Previous research show that voice characteristics are related to body size and physical attractiveness in humans insofar that we are able to make judgments about those traits basing on voice. Since testosterone has an impact on glottal folds structure, we hypothesized that morphological traits indicating level of masculinity (e.g. WHR, SHR, 2D:4D, body size), are related to voice characteristics. Therefore the aim of this study is to evaluate the relationship between the level of body and voice masculinisation in young women. **Methods:** Height, WHR, SHR and 2D:4D ratio were measured in 35 women (mean age 19.7). The size of trunk was calculated as  $\text{area of trapezoid } (((\text{shoulder width} + \text{hip width})/2) * \text{sitting height})/2$ . Voice samples were recorded using capacitor microphone with a preamplifier connected to PC. Acoustic analyses were made using DiagnoScope software. Participants were asked to say 'aaa aaa'. Fundamental frequency (F0), first four formants and formant dispersion were included in analysis. **Results:** We found positive correlation between 2D: 4D and two out of four formants (F1 and F3). Also we found negative correlation between height and voice pitch (F0) and negative correlation between trunk size and F2 but no correlation for formant dispersion. There was, however, no correlation between WHR, SHR, and acoustic characteristics of voice. **Conclusion:** Similarly to previous studies we found that women who are taller have lower voice pitch than those who are shorter. Voice pitch of both men and women depends on the body size as upper body part plays the role of a resonator and has an impact on the sound of voice. Also women with higher prenatal androgens level (lower 2D:4D ratio) tend to have lower formant frequencies. Therefore we conclude that the level of body masculinisation and voice characteristic in women are related.

## Poster 2

### **Myths and Maggots: A bias for disgust, but not for social information, in cultural transmission chains**

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The method of passing stories along a transmission chain was developed a century ago (Bartlett, 1932). Several biases operating on cultural transmission have been proposed. It has been suggested that cultural transmission is generally biased towards social information (Mesoudi et al., 2006). We tested whether stories with non-social and high emotional content are sometimes remembered more easily than those containing social information. We used stories that varied in their social and emotional content. In study one, using student participants, 40 chains of 4 participants (N = 160) were used to explore the accuracy of written recall of a four paragraph story. Each paragraph was based on an urban legend and included either high or low disgusting content and either high or low social content. In study two, we responded to criticism of the serial reproduction written recall method and used the same materials in an oral transmission study with 10 chains of four individuals (N = 40). Using an innovative method, the participants were non-student attendees at a social event who, individually, listened to the story; engaged in the social event and then returned to orally recall the story (the event was the distractor task). For both studies we found that the high disgust manipulation reliably increased recall accuracy further down the chain, consistent with a proposed content bias for disgusting elements. However, we found no consistent effect on recall of the manipulation of the social content. We consider how biases may act on transmission in several distinct phases of the process. A social bias influences what information to seek out and what to pay attention to but a disgust bias may have a stronger influence on what is recalled.

## Poster 3

### **Sexual dimorphism of face profiles and facial fluctuating asymmetry.**

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**Objective:** It is believed that testosterone is immunosuppressive and only men with good biological quality may afford high facial masculinization (FM). It is also believed that low fluctuating asymmetry (FA) is a signal of developmental stability and therefore it may be a cue of biological quality. If both FM and FA indicate individual's biological quality, one can expect negative relationship between them. Till now, the studies on FM concentrated on "en face" measurements. The aim of this study was to find sexually dimorphic indices on face profiles and to find relationship between level of masculinity assessed on face profiles and FA. Here we propose a few FM indices on face profiles and test if there is a relationship between the measurements of FA taken from "en face" photos and FM assessed on face profiles. **Methods:** Measurements of 134 male and 66 female faces were taken from "en face" and face profiles photos. On the base of these measurements, six indices of facial sexual dimorphism have been calculated for face profiles. Composite fluctuating asymmetry index was calculated for each person using 6 "en face" bilateral measurements of anthropometric points: cheilion (ch), gonion (go), alare (al), zygion (zy), exocanthion (ex) and endocanthion (en). **Results:** There were significant differences in the values of indices of facial sexual dimorphism between face profiles of males and females. We found, however, no relationship between FA and sexual dimorphism assessed on face profiles. **Conclusion:** Results show that face profiles can be used as indices of sexual dimorphism. The lack of correlation between facial masculinity measured on face profiles and FA suggests that FA and face masculinity may convey different information about individual's biological quality and are based on mechanisms that are not necessary related.

## Poster 4

### **Isolation by distance between spouses and its effect on children's growth in height in three stages of development.**

*Dariusz Pawel Danel<sup>1</sup>, Slawomir Koziel<sup>1</sup> and Monika Zareba<sup>2</sup>*

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**Objective:** Heterosis is thought to be an important contributor to human growth and development and may be promoted by evolutionary processes. Marital distance (geographical distance between parental birth places) is commonly considered as a factor favouring the occurrence of heterosis and can be used as a proximate measure of its level. The aim of this study is to assess the net effect of expected heterosis resulting from marital migration on the height of offspring in three stages of development (late childhood, adolescence and post adolescence), controlling for parental height and socioeconomic status (SES). **Methods:** Three-way (3 x 4 x 3) ANOVAs with Z-scores for children's height as a dependent variable and parental SES (high, medium, low), MD (<25km, 25-100km, 101-300km, >300km) and mid-parental height (MPH; tall, medium, short) as independent factors were carried out separately for boys and girls in three age groups (total N=5278). **Results:** Analyses revealed that in both sexes marital distance, MPH and SES had a significant effect on children's height in three age groups. The marital distance effect was always much more marked in boys than in girls from around twofold in the youngest group to more than fivefold in the oldest group. **Conclusion:** According to the 'isolation by distance' hypothesis, greater marital distance may increase offspring's heterozygosity, potentially promoting heterosis. We propose that these conditions may result in reduced metabolic costs of growth among the heterozygous individuals. Since boys grow longer and more intensively during adolescence they probably gain more energetic benefits than girls and their stature may be more affected by heterosis resulting from marital migration.

## Poster 5

### **Food first, then morality: exploring the (co)-evolution of commensality and morality**

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**Objective:** It has been suggested that throughout human history, commensality has been a means to celebrate the benefits of the indispensable cooperation in the acquisition of food, while simultaneously operating as a moral socialization system for novices. Might it be that commensality was not a by-product of the food acquisition process, but evolved as an adaptive solution to problems related to the need of a moral system? **Methods:** (1) analyses of eHRAF-files to find cross-cultural evidence for a strong link between commensality and morality, and (2) a survey to link current and past eating patterns with measurements of moral attitudes (making use of Graham and Haidt's Moral Foundations Questionnaire). **Results:** the analyses of the eHRAF-files illustrate how commensality correlates with all dimensions of the MFQ. The results of the survey show that, at least in a context of still married parents, there seems to exist a causal relation between family meals in childhood and current moral attitudes. Also, current actions of preparing and consuming home-cooked meals seem to correlate with various aspect of moral attitudes. Overall this study calls for further investigation of this topic. **Conclusion:** across cultures habits of commensality are strongly linked to various foundations of moral behavior, which supports our assumption that commensality might have evolved as means to achieve moral socialization. In a recent tradition of globalization and shifts in daily time-use towards increased media consumption and individual activities, commensality has been in decline. Combined with our assumption of a co-evolution of commensality and morality, it can therefore be expected that current moral attitudes will be less pronounced in individuals who partake least in communal meals, which can be confirmed by our survey data.

## Poster 6

### Convergence and copying in experimental microsocieties

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Previous experiments have documented the spontaneous emergence of group-specific design traditions in experimental microsocieties performing simple building tasks (Caldwell and Millen, 2008, *Evol Hum Behav*). These traditions also evidenced independent convergence on similar (successful) designs in later generations. The current study aimed to manipulate the designs to which early generation participants were exposed. The controlled manipulation of initial designs allows us to identify with greater certainty when participants chose to copy (which should favour relative persistence of design types over generations) and when they chose to innovate (favouring convergence). Using the spaghetti towers task (Caldwell and Millen, 2008), twelve chains each consisting of five individuals were run. These were virtual? microsocieties in the sense that participants did not meet, but were simply shown photographs of the designs produced by individuals in the previous two generations of their chain. Chains were initially seeded with towers of particular types (six chains of tower type A, and six chains of tower type B). In line with previous results, there was evidence of both copying and convergence. Further, some chains in this experiment exhibited a remarkable persistence of features from the original seed? designs throughout the chain. The persistence of features from the seeded designs over generations may represent a founder effect phenomenon, due to the highly consistent design types presented initially. Furthermore, although innovation is required for cumulative cultural evolution (the ratchet effect?), stable arbitrary (or suboptimal) traditions may persist due to risk aversion.

## Poster 7

### The Effect of Garlic Consumption on Body Odor Attractiveness

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Objective: Human body odor is relatively stable because it is to some extent determined genetically. But it could be also affected by environmental factors like changes across women's menstrual cycle, mood, diseases and of course our eating habits. Though we know very little about how individual alimentary components shape our body odor. We tested the effect of garlic consumption on body odor attractiveness. Methods: We used a balanced within-subject experimental design. Ten male odor donors were divided in two groups (A, B). Males in A group were given bread and butter mixed with 6g of garlic (responds to 1-2 cloves of fresh garlic), whereas men in B group were given only bread and butter. One week later we switched the meal. They fixed cotton pads in their axilla and wear them for 12 hours. Pads were then frozen. Odor samples were assessed for their pleasantness, attractiveness, masculinity and intensity by 14 women using hormonal contraceptives. Results were processed with t-test. Results: Differences in hedonic assessment in experimental (garlic) and control (non garlic) conditions were not statistically significant. This suggests that garlic consumption has no effect on axillary odor. Conclusion: Our results could be caused by that the majority of aromatic substances go out of our body through mouth and not enough get through the blood circulation to the axillary odor or may be we gave to volunteers small amount of garlic to manifest itself.

## Poster 8

### **Women's rape defense strategies from an evolutionary perspective: Emotions as psychological mechanisms mediating risk-taking behavior over the menstrual cycle**

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**Objective:** This study examines emotions as psychological mechanisms underlying rape-avoidance strategies. Based on Bröder and Hohmann (2003) we tested the hypothesis that women in their fertile days perceive more negative/less positive emotions at activities which are rape-risky than in their non-fertile days. Second, women do not exhibit cycle-dependent emotions at generally risky activities (i.e. not in the sense of rape), and third: women also do not possess cycle-dependent emotions at risky activities which involve acquainted men. **Methods:** 524 women (M = 27.38) indicated their positive and negative emotions while imaging 12 activities which were either risky in the sense of rape, generally risky, or risky involving an acquaintance in a 2 (ovarian cycle phase: fertile vs. non-fertile) x 2 (hormonal contraception: pill vs. no pill) x 3 (risk type: rape-risky vs. generally risky vs. acquaintance) design. **Results:** Fertile women increased negative emotions at rape-risky activities but did not reduce positive ones compared to their non-fertile days. This could only be found for women not taking birth control pills. Furthermore, fertile women exhibited less negative and more positive emotions at generally risky behaviour than in their non-fertile days which was also valid for pill-taking participants. Finally, it could be demonstrated that women possessed no adaptive emotions mediating risk-taking behaviour with acquainted men. **Conclusion:** Fertile women selectively enhance negative emotions as a function of rape defense- but solely towards unacquainted men.

## Poster 9

### **Matching Pairs. Perceived and Anthropometric (Dis-)Similarity in a Rural Sample of Long-Term Mates**

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Objective: Birds of a feather flocking together? is not only part of folk psychology, but has been backed by empirical findings showing that mates across different taxa pair up in a number of traits. Positive assortative mating also seems to apply to humans “ however, previous studies finding spouses to look more similar based on facial photographs provided only indirect evidence for mate resemblance. Next to the question whether couples are perceived to look more similar (1), we thus investigated the following questions: Are couples more similar in facial shape (2), and is our perception of similarity based on shape (dis-)similarity (3)? Methods: Using facial photographs of spouses at a post-generative stage, and pictures of the spouses at approximately the age they married, we conducted three studies: Study I dealt with the perceived similarity of couples and randomly paired people, employing two different set-ups involving 542 participants (n=31 couples), Study II examined anthropometric (dis-)similarity in facial shape using geometric morphometric methodology (n=57 couples), and Study III aimed to integrate both perception and measurements (n=24 couples). Results: Replicating previous findings, we found spouses to be perceived to look more similar (Study I). Study II showed that long-term mates also are less dissimilar in facial shape, but only regarding eyes and mouth region. In Study III, we were able to show that - contrary to previous reasoning - our perception of facial similarity is indeed related to (dis-)similarity in shape, an objectively quantifiable trait. Conclusion: Our findings indicate that there is positive assortative mating for facial traits. Still, findings are relatively subtle, and although we found spouses to be on average more similar, they are not necessarily the most similar of all possible combinations. Results are discussed in the context of trade-offs in mate choice, and potential evolutionary advantages of homogamy.

## Poster 10

### Different forms of disgust

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**Objective:** Disgust problems have been used as a model for moral judgement. Nichols (2002), for example, studied the moral-conventional distinction with disgust problems. Normally, in studying the moral-conventional distinction participants read scenario's whereby some moral or conventional norm is violated and are asked questions about permissibility, severity and influence of authority figures. Nichols asked similar questions with disgust scenario's and found that they elicited similar responses moral problems. Disgust is not a unitary phenomenon and disgust experiences can be triggered by a variety of stimuli, such as bad taste, fear of contamination, etc. Some forms of disgusting behaviour can be potentially harmful for bystanders, other forms not or far less so. Nichols (2002) used disgust examples in his scenario's which had a risk of contamination and could therefore harm bystanders (such as spitting). This study investigated whether forms of disgust with a limited chance of harm to bystanders would give the same response in the moral-conventional distinction.

**Methods:** Questionnaire study with moral-conventional distinction questions with different disgust scenario's varying in potential harm for bystanders. Similar scenario's were used as Nichols had done and other scenario's were derived from a well-known disgust scale (Olatunji et al. 2007).

**Results:** 157 participants answered moral-conventional distinction questions about a number of disgust problems. Nichols' findings regarding the moral-conventional distinction were confirmed when Nichols' own question were used, but there were different results for other disgust problems.

**Conclusion:** Disgust scenario's elicited different responses in the moral-conventional distinction and this did vary with the risk of harm to others. Maybe, potential harm for bystanders has been specifically selected as a subtype of disgust or as a more general process.

## Poster 11

### Can an increased longevity evolve via grandmothering despite the trade-off between fertility and adult mortality?

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**Objective:** The grandmother hypothesis proposes that the extended postmenopausal lifespan observed in humans evolved due to the inclusive fitness benefits that can be gained by older non-reproductive women who help their daughters and matrilineal grandchildren. But like any other animal, humans face the fundamental life history tradeoff between survival and reproduction: decreased adult mortality is thought to come at the expense of fertility. The grandmother hypothesis recognizes this, but requires that indirect fitness gains due to grandmothering during a postmenopausal lifespan are greater than the fertility sacrificed in order to decrease adult mortality. **Methods:** We investigate the effect of a fertility-mortality tradeoff on the evolution of extended longevity in simulated populations. As a first step, we assess under which conditions the strategy of helping one's kin during an extended postmenopausal period can invade a population of non-helpers who do not sacrifice fertility to extend their longevity. Second, we investigate how selection affects longevity, while assuming different values for the fertility costs of reducing one's adult mortality. **Results:** Whether or not the grandmothering? strategy can invade a population of non-helpers and the extent to which selection favors an increased longevity both depend on the shape and strength of the fertility-mortality tradeoff as well as the size of the benefits provided by the grandmother. **Conclusions:** While many researchers agree that there is a tradeoff between fertility and adult mortality, the size and shape of this tradeoff remains unknown. Our results imply that it will be difficult to fully test the grandmother hypothesis until we have learned more about the nature of the fertility-mortality tradeoff. Thus, future study of the fertility-mortality tradeoff would be of major importance for life history studies, in general, and for testing the grandmother hypothesis, in particular.

## Poster 12

### **Testing the prenatal androgen hypothesis on sexual orientation: measuring digit ratio (2D:4D) and number of older siblings**

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**Objective:** It's been suggested that prenatal androgen levels influence sexual orientation in both men and women. The ratio of the lengths of the second and fourth fingers (2D:4D) has been found to associate with sexual orientation, but published findings have often been contradictory. One reason for this may be the large ethnic diversity in studied populations. In men, sexual orientation has been found to correlate with an individual's number of older brothers, each additional older brother increasing the odds of homosexuality. It's been hypothesized that this fraternal birth order effect reflects the progressive immunization of some mothers to Y-linked minor histocompatibility antigens by each succeeding male foetus and the concomitantly increasing effects of such maternal immunization on the future sexual orientation of each succeeding male foetus. **Methods:** In this study, we assessed the relationship of 2D:4D to sexual orientation and number of older siblings. The study was conducted in Finland, where the population has been found to be genetically relatively homogenous. The participants were asked to fill a questionnaire regarding sexual orientation and number of siblings, and hand photocopies were obtained for assessing 2D:4D. In total we had over 1000 participants. **Results:** We found out that heterosexual men had lower 2D:4D ratios than homosexual men. In contrast to previous studies, lesbian women had higher 2D:4D ratios than heterosexual women. In our study, both homosexual men and women had more older brothers and sisters than heterosexual individuals. **Conclusions:** Our results suggest that prenatal exposure to androgens was lower in homosexual women than in heterosexual women. On the other hand, homosexual men seem to have lower prenatal testosterone than heterosexual men. The association between sexual orientation and the number of older siblings may be the result of a poorer condition of the womb due to previous pregnancies.

## Poster 13

### Females' sexual desire predicts preference for father-resembling mate

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**Objective:** Sexual imprinting theory suggests that during childhood humans internalize the facial appearance of the opposite-sex parent, which serves as a basis of mate choice in adulthood. Our aim was to obtain further behavioral evidence for this preference, and investigate how various features, such as attractiveness of the potential partners, and sociosexual strategies, influence imprinting-like processes. **Methods:** Four composite male faces were constructed, all of which consisting of eight individual faces of different levels of masculinity, respectively. Photos of female volunteers' and their parents were collected. Shape-only transforms of the composites were created, so as to resemble either subjects, their parents, or an unknown individual. Transforms were arranged into pairs separately within the four masculinity category. Volunteers were exposed to the image pairs, and were instructed to rate all faces, and choose a potential partner from each pair. They also had to rank the four untransformed composites. Finally, they were asked to fill out the SOI-R questionnaire. **Results:** Women showed significant preference for father-resembling faces as compared to controls, provided they were warped into the composites they rated the most attractive (which were in most cases the masculine ones). A similar tendency to choose self-resembling transforms was found as well. Furthermore, highly significant correlations were found between the scores obtained on the SOI-R questionnaire - particularly on the desire sub-scale - and the likelihood of choosing father-resembling faces made from composites of intermediate attractiveness. **Conclusions:** In accord with the previous studies, our recent results show that the idea of sexual imprinting is plausible indeed. Our data also revealed that imprinting may depend on sexual attitudes: females who fantasize more about having sex with strangers, are more likely to choose father-resembling mates than women with restricted sociosexuality.

## Poster 14

### Odour Preferences in Puberty

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**Objective:** It is generally thought that odour preferences develop in response to individual experience. However, perception of mate choice relevant odours might also be systematically related to sexual maturation. Thus, one might expect changes in preferences for bodily odours but not other odours (e.g. flowers) during puberty. **Methods:** In our study, 219 pubescents (aged 11-15, 94 boys) of various demographic backgrounds were recruited from mixed-sex general education schools. Pubertal development was determined by a self-assessment questionnaire using gender-specific line drawings of Tanner puberty stages. The test of odour preferences included odours of human origin (androstenone, androstenol, androstadienone), animal origin (castoreum), herbal (mint, salvia) wood (spruce), fruit (pear), spice (vanilla), floral (jasmine), drink (coffee) and food (garlic). Two drops of each odorant on a paper strip were rated for pleasantness and intensity on 7-point scale. Pubescents also completed a questionnaire on their olfactory experience and awareness. We asked them about their awareness of pleasant and unpleasant body odours among their acquaintances and how often they used perfumes and deodorants. **Results:** We found no differences in the pleasantness and the intensity of the samples at different pubertal stages ( $p > 0.002$ , corrected for multiple correction). Pubescents mostly judge their own sense of olfaction to be good, but differ in their ratings of their own axillary odour. 76 % of participants reported using deodorants or perfumes. In the questionnaire, close family members were more likely to be named as those with pleasant odours, whereas non-relatives such as friends and teachers were more likely to be ascribed an unpleasant odour (Pearson Chi-Square= 23,169,  $p < 0,0001$ ). **Conclusion:** Our results suggest that olfactory preferences are not affected by puberty. We did not find any specific changes related to biological maturation. Nevertheless, we confirmed that in pubescents there is a preference for odours of relatives.

## Poster 15

### **Signals of personality from the faces of humans and chimpanzees: Evidence for a shared signalling system**

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**Objective:** We investigated the evolutionary history of a signal system that allows us to receive socially-relevant information from static, non-expressive images of human and chimpanzee faces. **Methods:** In four studies, we investigated accuracy in perceiving extraversion-related characteristics from chimpanzee faces using both forced-choice and ratings tasks. In addition, we explored whether the ability to accurately perceive human extraversion showed any relationship with performance on these tasks. **Results:** We found that untrained human observers reliably discriminated characteristics related to extraversion solely from non-expressive facial images of chimpanzees. Observers were also able to accurately perceive extraversion in humans but performance on these two tasks was not correlated. **Conclusions:** In chimpanzees, as in humans, there is information in the static, non-expressive face that signals aspects of an individual's personality. We suggest this cross-species ability to receive information is best explained by shared personality structure and signalling in the two species. However, there also appears to be a more uniquely human aspect to the system.

## Poster 16

### **Combined oral contraceptive usage relates to sexual desire and functioning in single women.**

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**Objective:** This research investigated the effects of combined oral contraceptives (COC's) on sexual desire, functioning, satisfaction and attitudes. **Methods:** An online questionnaire was completed by 240 women (M= 22.13 years; SD= 2.85 years). Women provided information on COC usage, demographics and completed a series of scales on sexual desire, functioning, satisfaction, and attitudes: Female Sexual Function Index (FSFI, Rosen et al., 2000), Index of Sexual Satisfaction (ISS, Hudson et al., 1981), Revised Sociosexual Relationship Inventory (SOI-R, Penke and Asendorpf, 2008). Analyses were done by correlations, t-tests, and ANOVA (including covariates such as age, mood, relationship status and sexual experience). **Results:** COC use was not associated with women's satisfaction with their sex lives (ISS scores) or opinions about engaging in casual sex (SOI-R scores) (correlations; all  $p > 0.1$ ). Interestingly, COC use did influence sexual desire and sexual functioning (FSFI) but this was dependent upon women's relationship status. For women in a relationship, FSFI scores were not related to COC use (correlations;  $p > 0.1$ ). In contrast, in single women COC use was significantly associated with FSFI scores: single women using COC's reported reduced sexual functioning ( $r = -0.32$ ,  $p = 0.002$ ). This relationship was maintained when controlling for age, sexual experience and mood ( $F(4,85) = 4.818$ ,  $p = 0.001$  and Beta =  $-0.327$ ,  $p = 0.002$ ). **Conclusion:** The current research finds differences in sexual functioning between COC users and non-users. The effect of COC use on sexual functioning and desire was however not found for women in relationships, and there was no effect found for the sexual satisfaction scale. Results will be discussed with reference to the literature on COC use and its effects on mate choice and relationship quality.

## Poster 17

### Comparing Emotional Expression Across Species – GibbonFACS

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**Objective:** To understand the evolution of human emotional expressions, it is essential to investigate emotional expressions in animals using cross-species approach. The project aim is to develop an anatomically based objective tool according to existing facial action coding systems (FACS) to describe and classify facial expressions in gibbons and compare them with other apes including humans. Gibbons (Hylobatidae) belong to the Hominoidea together with great apes and humans, but as opposed to great apes, gibbons seem to use only few facial signals, which could be due to their limited group size. Moreover, they live in arboreal habitats of Southeast Asian rainforests, where close-proximity visual communication is hindered. Recent dissections of gibbon faces revealed that less facial muscles are present than in humans and chimpanzees, suggesting that socio-ecological factors are more important than phylogeny in determining morphology and complexity of facial muscles. Research was based on the question: Is facial expression complexity depending on the species' phylogeny or influenced by social or ecological traits? **Methods:** 57 captive subjects of six species representing three genera (*Symphalangus syndactylus*, *Nomascus gabriellae*, *N. leucogenys*, *N. siki*, *Hylobates pileatus*, *H. moloch*) were observed, resulting in about 110 hours of close-up video footage recorded using focal animal sampling. The clips were coded according to the FACS method, a catalogue and a corresponding review established. **Results:** 22 facial action units were identified in the Siamang gibbon, similar to the number found in chimpanzees and less than described in humans (36). **Conclusion:** Results indicate higher complexity of facial expression in gibbons than expected, suggesting that social and ecological factors were of minor importance compared to phylogeny in the evolution of facial expressions in the lesser apes. Future research will focus on the functional context of these signals.

## Poster 18

### Sex Differences in Orientation by Using Mobile Urban Exploration Tools

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**Objective:** According to Silverman and Eals (1992) spatial abilities of males differ from female ones. This can be seen during navigation in our daily life and also in virtual environments (Galea and Kimura, 1993; Moffat et al., 1998; Sandstrom et al., 1998). Evidence indicates that female orientation is landmark based, whereas men use Euclidean information about their environment (Galea and Kimura, 1993; Sandstrom et al., 1998). In this study we investigated whether these evolutionary-based sex differences in orientation also apply when modern mobile urban exploration tools are used for navigation (Baldauf et al., 2010). **Methods:** Therefore we developed a mobile computer application that allows choosing among several visualization methods with different ways to filter the information. In a field study, participants used our experimental multi-view prototype for overviewing and filtering tasks on a route through the urban environment of Vienna. Participants (26 subjects, 13 female and 13 male) were asked to explore the surroundings with the help of the device by using the following methods for viewing and filtering: 2D-view and 3D-view (spatial representations) and Tag-Cloud and Category List (content based orientation tools). **Results:** To analyze the results, we conducted a clickstream analysis (actions of subjects with the device) and an interview where participants ranked the different exploration possibilities the device offers. In the clickstream analysis we could show that male users prefer spatial-based visualization methods ( $p = .047$ , mean rank: female: 9.36, male: 15.15). In the interview female users tended to prefer content based and male users tended to prefer spatial visualization methods. **Conclusion:** The results indicate that in urban exploration women may have a stronger preference for content based information techniques than men. This finding is in line with previous studies on spatial orientation.

## Poster 19

### **Evidence of a Teaching Bias that may help to drive the cultural evolution of beliefs about reproductive behaviour**

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**Objective:** This study tests the effect of relatedness on communication about homosexuality. The belief that the marriage of same-sex couples should be regarded as equivalent to the marriage of opposite sex couples emerged recently in Western populations. This belief is maladaptive because when a culture offers the option of same-sex marriage, some individuals are more likely to avoid marriages that yield offspring. Understanding why maladaptive cultural traits emerge in a population provides cultural evolutionists with insights into our evolved capacity for culture, which is likely to include the inclination to be strategic about the cultural information we transmit as well as choosy about the cultural information we pay attention to. A number of maladaptive reproductive norms start to emerge after a population begins to undergo economic development and we have hypothesized that this is because economically developed populations have an evolutionarily novel low level of interaction between kin relative to non-kin. A previous study suggests that females bias their teaching about child-bearing behaviour when communicating with kin to encourage choices consistent with achieving reproductive success. **Methods:** Using a web-based study we asked over a thousand adults to write advice about homosexuality from the perspective of advising a younger stranger, a younger friend or a parent advising a son. Thus primed, we asked them about their own feelings about homosexuality. **Results:** In both sexes there was a greater disinclination to teach supportive information about homosexuality to a son than to a friend or stranger. Many participants also gave unprompted observation that having a gay son was problematic for the family due to desire to produce descendants. **Conclusion:** A teaching bias based on kinship may explain the rapid change in reproductive norms associated with economic development.

## Poster 20

### **Congenitally anosmic adults report less maternal care than normosmics**

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**Objective:** The reciprocal olfactory-based communication between mothers and infants widely reported in literature might substantially assist in the process of mother-infant attachment. The crucial importance of olfaction in mother-child interactions in the long term becomes most apparent in the congenital absence thereof. Thus, the aim of the present study was to investigate the consequences of congenital anosmia for the formation of the mother-infant bond, as assessed retrospectively. We hypothesised that congenital anosmics born to unaffected parents would differ in their recollections of maternal bonding behaviour during childhood. **Methods:** 28 individuals with isolated congenital anosmia (18-42 yrs) and 28 normosmics (18-42 yrs) participated in the study. They were administered the 25-item Parental Bonding Instrument, to assess their recollections of parental care and over-protectiveness, and the 21-item Beck Depression Inventory to assess depressive symptoms. **Results:** Statistical analysis revealed a significant difference in the maternal care dimension ( $F(1,54) = 8.62, p = .005, r = .37$ ), with congenital anosmics reporting less maternal care than controls. No difference was found in maternal overprotection, paternal care or overprotection, or depression score. No correlation between maternal care and educational status or age was found. **Conclusion:** The results of the present study indicate that retrospective perceptions of maternal care may be adversely affected by congenital anosmia. However, it is yet to be identified whether this is in consequence of altered maternal behaviours in response to children and adolescents who do exhibit early behavioural signs of their olfactory impairment. An alternative explanation would be that this is a case of no autobiographical olfactory memory, wherein the olfactory input may serve as a proxy for physical closeness which, in turn, is associated with activities such as breastfeeding and co-sleeping that are embodied forms of maternal care.

## Poster 21

### **Masculinization and man's cardiovascular reactions to acoustic stimulus of physical aggression**

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**Objective:** Aggressive individuals in animal models respond to a threat with more robust sympathetic arousal than non aggressive ones. Although human studies show the relationship between aggressiveness and physiological reactivity to aversive stimuli, there are no studies on masculinization level and physiological responses to threat-related stimuli. It could be expected that variability in expression of testosterone-depending morphological traits would be related to the differences in physiological reactivity to aversive stimuli. Here we test if physiological response to aggression acoustic stimuli is related to body masculinization and aggressiveness in men. **Material and Methods:** We measured cardiovascular reactions (e.g. heart rate, systolic (SBP) and diastolic blood pressure (DBP) and total peripheral resistance (TPR)) in 38 men (mean age: 24.4) who listened to the fight sounds from video game Manhunt. To assess cardiovascular reactions, we calculated the changes of each cardiovascular parameter by subtracting its baseline value from the mean value registered during stimulus presentation. Masculinization level was assessed by the shoulder to hip ratio (SHR) and 2D/4D ratio. Aggressiveness was measured with Buss and Perry Aggression Questionnaire. **Results:** We found no relationship between any of cardiovascular parameter and both SHR and 2D/4D ratio. There were, however, significant relationships between three subscales (Physical Aggression, Anger and Hostility) of the Aggression Questionnaire and the change in SBP ( $R=-0.45$ ) and DBP ( $R=-0.42$ ). Anger ( $R=-0.34$ ) and Hostility ( $R=-0.44$ ) appeared to be correlated with cardiac output, Hostility with heart rate ( $R=-0.46$ ) and TPR with Physical Aggression ( $R=-0.38$ ) and with Hostility ( $R=0.41$ ). **Conclusions:** Men's body masculinization is not a good predictor of physiological reactivity to aggression acoustic stimuli. Contrary to prediction, less aggressive individuals have more pronounced physiological response.

## Poster 22

### Are attractive women more fertile? Evidence from a rural sample

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**Objective:** The aim of our study was to clarify whether facial attractiveness predicts reproductive success in women, and whether fluctuating asymmetry (FA) as a core component of facial attractiveness, correlates with women's reproductive success. **Methods:** We collected pictures from 88 postreproductive women of a rural society in Austria showing faces at the age of 18 to 23 and we took standardized facial pictures of our subjects at current age. Questionnaire data included information about the number of biological offspring and sociodemographic variables. 125 students of the University of Vienna rated the physical attractiveness of the women based on the adolescence faces. FA was measured using 2D landmark-based Geometric Morphometrics Methodology (GMM). The shape of the women's present-day faces, including FA, was quantified by measuring a set of 93 anthropological landmarks. In addition, physical attractiveness during adolescence and number of children were regressed on facial landmarks, thus leading to a shape correspondent of the dependent variables. **Results:** Among those who never used hormonal contraception, women who were rated as more attractive have more biological offspring than women rated as less attractive. Shape regression revealed that similar features correspond to the number of children and rated attractiveness. FA at postreproductive age and rated attractiveness at age 18-23 are associated, but the relation between level of FA and number of children remained below significance. **Conclusion:** This study provides evidence that physical attractiveness may indeed be related to reproductive success in humans. A low level of FA affects the attractiveness of a face but it does not predict reproductive success. This might be due to attractiveness being a composite of several markers. Choosing an attractive woman might thus be adaptive in terms of reproductive prospects.

## Poster 23

### **Adequacy of attributions personality characteristics based on 2D and 3D facial representation of judged individual**

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**Objective:** People can to some extent adequately judge personality of others based on facial photographs. In real life setting, these judgments are made based on 3D stimuli. Therefore, we tested whether more ecologically valid stimuli (3D scans) will increase adequacy of personality judgments compared to en face photographs (2D stimuli). In our previous study we have found the connection between facial masculinity and male dominance. Given that masculine features are more visible in profile (e.g. chin prominence) we presumed higher adequacy of dominance attribution based on 3D stimuli compared to photographs. Because the development of masculine features is under influence of testosterone, we expected cross-cultural agreement in dominance judgment. **Methods:** Facial photographs and 3D scans of 52 men and 50 women were taken and the participants filled in personality questionnaires NEO-PI-R and Cattell's 16 PF. The stimuli were then rated by 199 Czech women and 178 Czech men (on average 13 ratters per characteristic) for masculinity, attractiveness and five personality factors (Agreeableness, Neuroticism, Opened to experience, Extraversion, Conscientiousness) and 2 selected Cattell's factors (Dominance and Anxiety). Furthermore 17 Namibian men and 16 Namibian women rated only male stimuli for dominance **Results:** We found positive correlations between the personality profile of the depicted person and attribution of Extraversion in case of Czech male's ratings of women's 3D stimuli. In model not separating sex of stimuli, Dominance was rated adequately based on 3D stimuli by both sexes of Czech raters. We did not find any positive relationship between photographs' ratings and personality profile of the photographed person. Namibian raters did not rate Dominance adequately **Conclusion:** Our results show that using 3D stimuli increases adequacy of personality attribution. However, our presumption of adequacy of dominance rating in different cultural context wa

## Poster 24

### Gender differences in longing to have a baby

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**Objective:** Childbearing in low-fertility societies increasingly results from wanting a(nother) child and also from intense longing for a child. To the extent that baby longing is underpinned by heritable dispositions (eg. nurturing, extraversion) it is currently under selection. (Rotkirch 2007, Miller 1994.) The gender differences of this emotion are unknown. We study the intensity, context and outcomes of baby longing in men and women. **Methods:** Cross-tabulation and binary logistic regressions of three nationally representative surveys of adult Finns from 2007-09. Questions include having ever longed for children and how often, in what kind of life situation longing first occurred, whether longing resulted in a child, and the importance of longing for the decision to have the last child. **Results:** Baby longing occurs in connection with a majority of births in Finland and especially before the first child. It was most often felt when trying to achieve pregnancy. Men report longing less often and less intensely, and a higher influence of partner longing, while women had more often longed since youth and as a result of kin and friend's pregnancies. Baby longing is not significantly related to education but is related to numbers of children and numbers of unions. **Conclusion:** Baby longing influences the decision to have a child as well as the desire to keep on trying in case of obstacles. It can guide fertility and couple behavior and prepare for parenthood. While men are more likely to start longing when the decision to have a(nother) child has already been made, the relatively small gender differences are in line with other recent findings stressing the similarity of men's and women's parenting emotions.

## Poster 25

### **Negative Attitudes towards Evolutionary Psychology are related to religiosity but this relationship is not mediated by attitudes towards science: Implications for teaching EP**

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**Objective:** An evolutionary approach to human behaviour is often criticized by (certain) extreme religious groups. It is, however, not clear whether these negative attitudes among the very religious stem from a more general negative evaluation of science. We explored the relationships between religiosity, attitudes towards science and attitudes towards Evolutionary Psychology (in the broad sense; EP) in a student sample. **Methods:** 346 first-year psychology students at a large Dutch university completed an online questionnaire (M=20,14 years, SD=2,79 years; 266 women, 80 men; 32% Protestant, 17% Catholic). The questionnaire consisted of the Age-Universal Intrinsic-Extrinsic Religiosity Scale, (Maltby, 1999), the Francis Scale of Attitudes toward Christianity (short version; Francis, 1993), the Student Interests and Motivation in Science Questionnaire (Hassan, 2008), and a newly developed scale on attitudes toward EP (Cronbach's alpha=.81). Data were analyzed by use of correlations and partial correlations. **Results:** There was a moderately strong correlation between religiosity and attitudes toward EP ( $r(344)=-0,373$ ,  $p<0,0001$ ): a higher degree of religiosity was associated with a more negative view of EP. This effect remained after controlling for attitudes toward science, gender, age, and whether the participant was enrolled in the Dutch or English bachelor course (partial  $r(340)=-0,396$ ,  $p<0,0001$ ). Analyses on Christians with the Francis scale showed similar results. Attitudes towards science did not relate to any measure of religiosity but a positive attitude toward science was correlated with a positive attitude towards EP ( $r(344)=0,171$ ,  $p<0,001$ ). **Conclusion:** Religiosity was negatively associated with positive attitudes toward EP, but this is not due to a more general negative attitude toward science among the highly religious. Results are discussed with reference to the literature on EP and religious attitudes as well as teaching EP at university level.

## Poster 26

### **The influence of sexual imprinting on facial attractiveness and perceived dominance**

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**Objective:** Recent studies showed that female preferences of some traits in potential sexual partners are influenced by individual factors such as sexual imprinting. The main aim of the current study is to test possible influence of sexual imprinting of women on preferred male facial dominance. We presume that women will prefer similar level of perceived dominance in male facial pictures as they perceived in their fathers. Further, the quality of the relationship with the father during childhood can also influence this presumed correlation. **Methods:** Eighty female students (average age 22.3) rated attractiveness and submissiveness-dominance of 67 standardized male facial photographs on 7point scales. Raters filled in a questionnaire on relationship with their father during childhood, father's perceived dominance. Rated targets filled in a questionnaire on their own dominance. Male facial photographs were split into two groups on those perceived as dominant (n=37) or submissive (n=30). Consequently, series of paired t-tests were performed to test the differences in preferences of dominant or submissive faces, controlling for the perceived dominance and relationship of the female raters with their father. **Results:** Results showed no significant differences between submissive and dominant male faces in attractiveness ratings and there was also no influence of the reported fathers dominance or relationship with the rater. Finally, perceived dominance did not correlate with self-reported dominance of the rated men. **Conclusion:** The results show, that the perceived dominance of the father and the relationship with him does not influence female preferences for dominant or submissive male faces. We suggest that facial dominance and fathers personality dominance as assessed by the raters do not need to correlate. Indeed, we did not find any relationship between self-reported dominance and dominance as rated from facial pictures.

## Poster 27

### The evolution of sexual swellings in catarrhine primates

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In *The Descent of Man, and Selection in Relation to Sex* (1871; Murray), Charles Darwin noted that, while males are more ornamented than females in most animal species, the reverse is found in some cases. Darwin gave the example of the rhesus macaque, in which 'the female has a large surface area of naked skin around the tail, of a brilliant carmine red' (pg. 293), and argued that colouration on the hindquarters of primates could have resulted from sexual selection pressures (Darwin, *Nature* 15: 18-19). Evolutionary biologists have begun to test hypotheses for why females might be ornamented in some species using comparative statistical analyses. In primates, researchers have focused particularly on the enlarged sexual swellings exhibited by some catarrhine species. These swellings are concentrated in species where polyandry is the predominant mating system, and this relationship remains when phylogenetic non-independence is taken into account (Pagel and Meade 2006). The most recent explanation for the evolution of sexual swellings, the 'graded signal' hypothesis (Nunn 1999), suggests that enlarged swellings are probabilistic indicators of fertility and function to promote paternity confusion, in addition to attracting mates. However, we believe that this explanation is inadequate and, instead, propose the 'female ornamentation' hypothesis. We predict that larger swellings will be selected for when females benefit from multiple mating and when males are likely to be selective in their mating efforts due to high potential costs, and test our position using comparative statistical techniques. We propose that the occurrence of multi-male mating in species that lack sexual swellings (e.g. the vervet monkey, *Chlorocebus pygerythrus*) can be explained by lower intensity of male competition and mating effort relative to multi-male mating species in which swellings do occur. The implications of our research for the understanding of human sexual behaviour are discussed.

## Poster 28

### **Cultural evolution influences perception: an experimental study using artificial languages**

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**Objective:** There has been a recent resurgence of interest in experimental studies testing linguistic relativity “ the view, associated with Benjamin Lee Whorf (1956) that the language we speak influences our perception of the environment. Furthermore, recent experimental work in evolutionary linguistics (e.g., Kirby, Cornish and Smith, 2008) has proved to be successful at explaining how language cultural transmission can shape language properties. In light of these findings, the objective of this research was to investigate whether cultural evolution of artificial languages can differentially influence the language learners’ perception of a continuous meaning space shared by these languages. **Methods:** 27 native English speakers were trained on two culturally-evolved artificial languages (taken from a previous study by Matthews, Kirby and Cornish, in prep.). These languages evolved two different labelling systems for describing a set of geometric shapes. In particular, in Language 1 a linguistic distinction was made between rotated and unrotated shapes, whereas in Language 2 the labels of shapes were invariant under rotation. After learning one of these languages, participants rated the similarity of pairs of shapes taken from the meaning space using a visual analogue scale. The pairs consisted exclusively of pairs in which one shape was a rotation of the other. **Results:** A paired-samples t-test indicated that Language 1 learners perceived rotated and unrotated shapes as being less similar to each other compared to Language 2 learners;  $t(23)=-3.41$ ,  $p=0.002$ . This result supports the hypothesis that cultural evolution of two different artificial languages can evoke differential perception of the same meaning space in their learners. **Conclusion:** The current result demonstrates that the on-going cultural evolution of languages influences not only structural properties of those languages, but also the perceptions of language learners.

## Poster 29

### Sexual strategy and women's preferences for facial skin colour in men

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**Objective:** According to previous studies, women prefer more masculinized male faces for short-term relationship (STR) than for long-term relationship (LTR). This women's preference is explained by choosing males with indicating better genetic quality higher level of testosterone, which positively correlates with masculinization. Since testosterone was also found to cause darker skin colour in men, the aim of this study is to investigate if women differ in preferences toward male skin colour in context of short and long-term relationship. **Methods:** Skin colour was measured in 67 men of mean age 21.5, using a spectrophotometer in RGB colour space. On the base on colour data from measured sample, 7 variants of composite faces were made, which were divided for three categories: lighter than average, average and darker than average. The stimulus faces varied only in terms of skin colour. 109 women of mean age 20.5 years participated in the study. The menstrual cycle phase was also controlled. **Results:** Although there was some trend with choosing for long-term relationship male face with average colour and non-light faces (average and darker) for short-term relationship, the difference was not statistically significant. There was no relationship between menstrual cycle phase and women's face preferences for long or short-term relationship. **Conclusion:** Women do not take into consideration the skin colour when choosing potential long- or short-term sexual partner.

## Poster 30

### **Like father, like self: Emotional closeness to father, but not mother, predicts women's preferences for self-resemblance in opposite-sex, but not same-sex, faces**

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**Objective:** Studies showing effects of self-resemblance for both same-sex and opposite-sex faces have been interpreted as evidence for self-referential phenotype matching. However, research on sex-contingent face processing suggests that visual experience with faces of one sex has little influence on perceptions of faces of the other sex, calling into question how self-referential phenotype matching can influence perceptions of opposite-sex faces. Because children resemble their parents, here we test whether familial imprinting can influence preferences for self-resemblance in opposite-sex faces. **Methods:** 116 women were paired with age- and ethnicity-matched controls. Each pair viewed the same set of faces. Participants chose the more attractive face from 10 pairs of self- versus other-resembling faces and 10 pairs of control- versus other-resembling faces. Self-resemblance preference was scored as the number of times each participant chose the self-resembling faces minus the number of times their control chose those same faces. Participants also rated how much emotional support they received from their father and mother. **Results:** Women's reported emotional closeness to father was positively correlated with their self-resemblance preferences for male faces only. Women's reported emotional closeness to mother was not related to self-resemblance preferences for either male or female faces. As in previous research, self-resemblance preferences were greater for same- than opposite-sex faces. **Conclusion:** These findings implicate familial imprinting in preferences for self-resemblance in opposite-sex individuals and raise the possibility that familial imprinting and self-referential phenotype matching have context-specific effects on attitudes to self-resemblance.

## Poster 31

### **Jealousy as a function of menstrual cycle stage and contraceptive use: an analysis by an improved methodology.**

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**Objective:** Using a within-subjects design we examined the potential for changes in self-reported jealousy across the menstrual cycle. We then tested if self-reported levels of jealousy differ when women are using hormonal contraceptives versus when they are regularly cycling. **Methods:** We tracked fifteen female participants over the course of five months, both while they were regularly cycling and once they had initiated the use of hormonal contraceptives. While regularly cycling, participants underwent transvaginal ultrasonography every 2 +/- 3 days in order to monitor follicular growth and to determine their proximity to ovulation. This methodology allows for a more accurate estimate of conception risk compared to previous techniques used within the field (e.g. counting, LH strips). Moreover, use of transvaginal ultrasonography allows for the identification of anovulatory cycles in which follicles are luteinized yet remain unruptured. Participants completed two surveys when regularly cycling (prior to ovulation and during the luteal cycle phase) and one after having used hormonal contraceptives for a duration of three months. **Results:** Results were analyzed using hierarchical linear mixed modeling. We found that increased conception risk is associated with significantly higher levels of jealousy. Further, we found that when using hormonal contraceptives, self-reported jealousy levels do not differ significantly from levels reported during the fertile or non-fertile cycle stages. **Conclusion:** These findings suggest that jealousy may be influenced differentially by endogenous and exogenous hormones. While absolute levels of jealousy appear not to vary on and off hormonal contraceptives, future work is needed to determine the significance of the temporal role of menstrual cycle shifts in jealousy.

## Poster 32

### Lineage specific evolutionary processes in large language families

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**Objective:** Language universals have been widely investigated within a descriptive typological tradition associated with Greenberg, and a generative tradition associated with e.g. Chomsky, Baker. In this paper I use phylogenetic comparative methods to evaluate the universality of the phenomena that these traditions take for granted. **Methods:** Putatively intercorrelated features of language structure are analysed using phylogenetic comparative methods. These methods are used to (i) test the correlations between features while correcting for phylogeny (Galton's problem), and (ii) investigate the evolutionary processes (in terms of models of transition probabilities) underlying those correlations that remain after correction. The results are related to what is known about processes of language change in the language family from historical linguistic reconstruction. The database includes published and newly coded lexical and structural data from a number of large language families, including Austronesian, Indo-European, Bantu, Uto-Aztecan, and Aslian/Austroasiatic. **Results:** Contrary to the predictions of the universalist traditions in the study of language variation, the predominant patterns of evolutionary dependency are lineage specific. Language families differ from each other in two ways: families have different sets of feature pairs showing correlated evolution, and even where two families show a dependency between the same feature pair, the model of evolution (in terms of transition probabilities between states in the dependent model) often indicates significantly different evolutionary processes. **Conclusion:** Evolutionary approaches to language change provide new ways of understanding linguistic diversity. The results of these analyses show that evolutionary processes acting in different language families have a high degree of lineage specificity. This has significant implications for both descriptive and generative approaches to the universals of language.

## Poster 33

### Red enhances men's attraction to young women - and women chose red outfits to impress

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Objective Elliot and Niesta (2008) found, that red, relative to other colors, leads men to view young women as more sexually desirable, because red and its connections to sexuality may have roots in our biological heritage as a cue to female's ovulation. Study 1 If red signals ovulation, then only young women should be perceived by men as more sexually attractive but not menopausal women. This effect should be independent of the ages of male participants. Methods 60 younger (M = 24.67 years) and 24 older men (M = 54.37 years) judged the sexual attractiveness of women in a 2 (background color: red vs. white) x 2 (age of stimulus: young vs. menopausal) x 2 (age of participants: young vs. elder) experiment. Results Only young women are judged as more sexually attractive against red backgrounds. For menopausal women, a similar effect could not be found. This effect is independent of the men's ages. Study 2 In Study 2, we explored whether young women are aware of the red effect. Methods 68 women (M = 24.38 years) rated their sexual attractiveness and competence in four different outfits for an imagined dinner in a 2 (color of outfit: red vs. blue) x 2 (outfit: short dress vs. panty suit) x 2 (dinner: same-sex friend vs. potential male partner) experiment. Results Women think they are perceived as more sexually attractive but less competent in red outfits, as compared to blue outfits. General Conclusion Men perceive young women as more sexually attractive when they are associated with the color red. Women seem to be aware of this and may systematically use it to their advantage - perhaps especially during the fertile phases of the cycle.

## Poster 34

### Facial masculinity is a cue to women's dominance

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Objective: Perceptions of others' dominance play an important role in social perception and behaviour. Although many previous studies have reported positive correlations between men's facial masculinity and indices of their dominance, there is very little evidence for corresponding relationships between masculine facial characteristics and indices of dominance in women. Consequently, the current study investigated the relationship between women's scores on the dominance subscale of the International Personality Items Pool (IPIP) and ratings of their facial masculinity. Methods: Full-face, full-colour digital photographs were taken of 93 young adult women, each of whom also completed the dominance subscale of the IPIP. Versions of these face images in which hairstyle and clothing were masked were then rated for both femininity and attractiveness using 1 (very low) to 7 (very high) scales. Results: Regression analysis revealed a significant negative relationship between women's rated facial femininity and their scores on the dominance subscale of the IPIP. By contrast, there was no independent relationship between women's rated facial attractiveness and their scores on the dominance subscale of the IPIP. Conclusion: These findings suggest that women with more masculine faces tend to be more dominant, complementing similar findings for masculinity and dominance in men.

## Poster 35

### **Why do women like bad boys, and what have ovaries got to do with it? Female preference for Machiavellian males across the menstrual cycle**

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**Objective:** Previous studies have found that seemingly unpleasant personality traits, such as Machiavellianism, can confer advantage to males in short-term mating. Machiavellian men have increased number of sexual partners (and therefore potential conceptions) compared to their less Machiavellian counterparts (Jonason et al, 2009). There is some indication that women prefer arrogant and potentially unfaithful men in short-term mating during more fertile stages of their menstrual cycle (Gangestad et al, 2007). It is possible that females, subconsciously, perceive the trait Machiavellianism as a fitness indicator, and prefer high Machs in short term mating when at the fertile stage of their cycle. **Method:** The present study tested whether females show varying degrees of preference across their menstrual cycle for dating adverts written by Machiavellian males. Thirty male undergraduates were asked to write dating adverts and fill in the Mach IV scale. The four highest (mean 99.75) and the four lowest (58.75) scorers on the Mach scale were chosen for the second phase of the study, in which women rated the adverts for attractiveness in both short and long term mating contexts. Out of the 142 women who participated, 59 used oral contraceptives (and were therefore excluded from the main analysis), 22 were in the high-fertility phase, and 61 were in the low-fertility phase of their menstrual cycle. **Results:** As expected, it was found that when the likelihood of conception was high, females rated high Mach adverts as being more desirable than low Mach adverts for one-night-stands. **Conclusion:** Women in this study preferred manipulative men when they were at the most fertile phase of their cycle. The findings are discussed with a reference to

## Poster 36

### Attentional prioritisation for baby schema

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**Objective:** Konrad Lorenz proposed the existence of Kindchenschema (baby schema), an optimal configuration of infantile facial features that elicits a caregiving response in human adults. Kindchenschema is characterised by a relatively large forehead and eyes, round face and small mouth. The preference for this configuration has been demonstrated in several studies that have manipulated the schema features, and had people rate each variant for cuteness?. The present study asked whether kindchenschema preference manifests in terms of attentional prioritisation. **Methods:** Experiment 1 employed a visual search task in which participants searched for either baby, adult, monkey, or tiger faces presented amongst distracter faces. Experiment 2 examined whether attention can be focused to different parts of the visual field by the eye gaze direction of baby and adult faces. **Results:** The results of Experiment 1 showed that baby and tiger faces attracted attention more readily than did the other face types, with baby faces recognised fastest overall. Those of Experiment 2 suggest that baby faces elicit a more expansive attentional focus than do adult faces. **Conclusions:** These findings indicate that infant faces occupy a special status in human cognition. The results will be discussed in terms of whether the response to infant faces is primarily attentional or motoric in nature.

## Poster 37

### The relationship between personality profile and body posture

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**Objective:** Previous studies have confirmed the relationship between body posture and personality traits, especially extraversion, femininity and dominance. Only a few of these studies, however, focus on static posture. The aim of our study was to find a relationship between the human personality and specific aspects of static body posture. **Methods:** We photographed 72 women and 70 men who were asked to stand in a relaxed position. All participants filled out the NEO-PI-R and their scores in Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness were calculated. The photographs were coded for 40 body posture categories by a trained experimenter. The effect of body posture categories on personality traits was computed using T-tests for independent groups. **Results:** A significant association with personality traits was found for several posture categories.

- Knee pointing inwards was related to higher Neuroticism ( $p = 0.26$ ) and 3 Neuroticism facets.
- Tiptoes pointing outwards were related to lower Conscientiousness ( $p = 0.01$ ) and one Conscientiousness facet.
- Hands behind back were associated with lower Openness to experience ( $p = 0.015$ ), lower Agreeableness ( $p = 0.038$ ) and higher Conscientiousness ( $p = 0.011$ ), along with one Openness- and two Conscientiousness facets.
- Legs far apart were correlated with higher Extraversion ( $p = 0.019$ ) and 3 Extraversion facets, and the
- legs not apart category was related to higher Neuroticism ( $p = 0.019$ ) as well as 3 Neuroticism facets.

**Conclusion:** The results show a significant relationship between personality traits and some aspects of body posture. Due to the large amount of T-tests, the study should be regarded as exploratory and confirmed by follow-up studies.

## ***INDEX OF AUTHORS***

# Index of Authors

- Acerbi, A, 49  
Aitken, S, 69, 106  
Alanko, K, 35  
Alvergne, A, 21  
Antfolk, J, 35  
Archetti, M, 33  
Atkisson, C, 46
- Babiszewska, M, 72  
De Backer, C, 76  
Baldauf, M, 89  
Bard, K, 20  
Benny, S, 35  
Berezkei, T, 27, 53, 84  
Blanchard, A, 25  
van Bodegom, D, 24  
Brown, G, 98  
Brown, SP, 55  
Bryson, JJ, 55  
Burrows, A, 88  
Burkart, J, 22  
Buunk, AP, 34, 36, 102
- Caldwell, CA, 40, 48, 77  
Chrzanowski, M, 74  
Clech, L, 19  
Cobey, KD, 36, 87, 102  
Coelingh, H, 102  
Cole, GG, 67, 107  
Coultas, J, 73  
Courtiol, A, 37  
Crawford, JR, 66  
Croy, I, 91
- Danel, DP, 75  
Deak, A, 27
- DeBruine, LM, 59, 66, 95, 101, 105  
Dengler, D, 72  
Dunn, M, 103
- Ehn, M, 39, 54  
Enquist, M, 39, 49  
Eriksson, K, 73  
Eve, RM, 77
- Faurie, DC, 45  
Fialova, J, 78  
Fieder, M, 32  
Fortunato, L, 33  
Fraccaro, PJ, 101  
Franz, M, 87  
Frey, U, 62  
Froehlich, P, 89
- Gagnon, A, 30  
Galis, F, 70  
Gand, KM, 79  
Garcia, J, 41  
Ghirlanda, S, 49  
Gibson, DM, 18, 19  
Grammer, K, 31, 61, 80, 93
- Havlicek, J, 64, 65, 78, 85, 91  
Heady, P, 42  
Hill, K, 16  
Holzleitner, IJ, 80, 93  
Hubbeling, D, 81  
Hublin, JJ, 82  
Huber, S, 32  
Hummel, T, 91
- Isler, K, 22

Johow, J, 43  
Jokela, M, 95  
Jones, BC, 59, 66, 101, 105  
Just, M, 72

Kachel, F, 82  
Kandler, A, 57  
Kangassalo, K, 83  
Katina, S, 93  
Kecko, S, 63  
King, JE, 86  
Kirby, S, 99  
Klapilová, K, 108  
Klipping, C, 102  
Kohoutova, D, 85  
Kocsor, F, 84  
Koziel, S, 75  
Krama, T, 63, 68  
Kramer, RSS, 86  
Krams, I, 63, 68  
Kuchenbuch, P, 88

Laland, KN, 54, 57  
Lamba, S, 17  
Lawson, DW, 18  
Leijten, FRM, 87  
Lembeck, M, 88  
Lenochova, P, 64, 78  
Liebal, K, 88  
Lindová, J, 108  
Little, AC, 59, 66  
Lubell, M, 50  
Lummaa, V, 21, 45  
Lyons, M, 25, 26, 106

Massar, K, 96  
Masuch, K, 89  
Matthews, C, 40  
May, L, 24  
Mazur, A, 21  
McElreath, R, 50  
van der Meij, L, 36  
Mesoudi, A, 47  
Milinski, M, 51

Morawska-Kochman, M, 72  
Morgan, K, 69  
Morgan, TJH, 54  
Morris, P, 20  
Morrison, E, 20  
Mueller, U, 21

Nettle, D, 34  
Newson, L, 44, 50, 90  
Nitsch, A, 45  
Nodwell, H, 69  
Novakova, L, 91

Oberzaucher, E, 61, 80, 93

Paál, T, 53  
Paleczny, B, 92  
Papp, P, 27  
Paramei, GV, 25  
Parkinson, H, 106  
Pawlowski, B, 72, 74, 92, 100  
Pflüger, LS, 80, 93  
Pivoňková, V, 94  
Ploeger, A, 70  
Pollet, TV, 34, 36, 87, 96, 102  
Premo, LS, 82  
Ptackova, K, 65

Quist, MC, 105

Rantala, MJ, 63, 68, 83  
Raymond, M, 21  
Reader, SM, 50  
Rendell, LE, 54  
Richerson, PJ, 38, 44, 50, 90  
Roberts, G, 40  
Roberts, SC, 65, 102  
Rotkirch, A, 95  
Rubešová, A, 94  
Rusch, H, 62

Saxton, T, 60, 85  
van Schaik, C, 22  
Schank, JC, 44  
Scholz, S, 96

Scott-Phillips, T, 58  
Schwarz, S, 104  
Sear, R, 23  
Shenk, MK, 46  
Sheppard, P, 29  
Silva, A, 21  
Simner, J, 99  
Singer, M, 104  
Skarratt, PA, 107  
Skrinda, I, 63  
Smaldino, PE, 44  
Smith, FG, 101, 105  
Stahlberg, D, 79  
Štěřbová, Z, 97  
Störmer, C, 28  
Street, S, 98  
Stulp, G, 34  
Stymne, AC, 39  
Sukiennik, I, 72  
Swoboda, K, 99  
Szymanczyk, J, 100

Takezawa, M, 52, 56  
Tane, K, 52  
Tiddeman, B, 60  
Toelch, U, 50  
Towner, MC, 46

Vaisanen, H, 95  
Valentová, J, 97  
Vavrova, K, 65  
Vávra, J, 108  
van Veelen, M, 41  
Verhulst, S, 34  
Vukovic, J, 101

Waller, B, 88  
Ward, R, 86  
Watkins, CD, 95, 101, 105  
Welling, LLM, 66  
Westendorp, RGJ, 24  
Wilkins, AJ, 67  
Willführ, KP, 30

Xiao, D, 60

Zareba, M, 75  
Zelazniewicz, A, 72



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