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SCHEDULE

	Audimax	Lecture Hall A	Lecture Hall B	Lecture Hall C	Lecture Hall D
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Wednesday, July 21th, 2004

5.00–9.00 PM	Welcome mixer (Henry Ford Bau)				
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Thursday, July 22nd, 2004

9.00–10.00 AM	Wolfgang Enard, "The Genetical Basis of Human Language"				
10.00–10.20 AM	Coffee break				
10.20 AM–12.20 PM	Cooperation in Large Groups (Symp.)	Mating Strategies	Parental Investment	Individual Differences in Life- History Strategies (Symp.)	2D:4D Digit Ratio and Sex-Dependent Behaviors (Symp.)
12.20–1.30 PM	Lunch				
1.30–3.10 PM	Debate, Gerd Gigerenzer, Keith Stenning, "The Evolution of Cognitive Mechanisms"	Health	Media, Gossip and Human Universals (Symp.)	Brain and Cognition	Kinship
3.15–4.15 PM	Bernard Comrie, "Languages and Genes, Inheritance and Replacement"				
4.15–4.35 PM	Coffee break				
4.35–6.35 PM	Remembering What Linda Mealey Said (Symp.)	Mate Preferences I	Media, Gossip and Human Universals (Symp.) / ToM and Culture	Fertility and Fitness	Personality / Adaptive Functions of Memory
6.45–7.45 PM	Keynote Talk (Audimax)				
8.00 PM	Banquet (Harnack House, special fee)				

Friday, July 23rd, 2004

9.00–10.00 AM	Hans Peter Kohler, "Genetics and the Biodemography of Fertility"				
10.00–10.20 AM	Coffee break				
10.20 AM–12.20 PM	Female Competition (Symp.)	Philosophical Critics (Symp.)	Is Depression an Adaptation?	Mate Preferences II	Signals and Sentiments (Symp.)
12.20–1.30 PM	Lunch			Student Member Lunch (KS 1)	Executive Council Meeting (KS 2)
1.30–3.10 PM	Determinants of Norms of Cooperation (Symp.)	Mutual Mate Preference (Symp.)	New Approaches to Physical Attractiveness	Emotion	Evolution and Cognition (Symp.)
3.15–4.15 PM	James Carey, "The Evolution of Human Longevity"				
4.15–4.35 PM	Coffee break				
4.35–6.35 PM	Consumer Behavior (Symp.)	Grandparental Investment (Symp.)	Evolutionary Thinking in Sociology (Symp.)	New Perspectives in Darwinian History (Symp.)	Evolutionary Psychology and the Social Sciences
7.00–11.00 PM	Boat Tour				

SCHEDULE

Saturday, July 24th, 2004

9.00–10.00 AM	Richard Dawkins, Peter Hammerstein, David Harper, and Eörs Szathmáry "Memorial for John Maynard Smith"				
10.00–10.20 AM	Coffee break				
10.20 AM–12.20 PM	Open Problems in Theoretical Biology	Language and Speech	Cooperation and Punishment (Symp.)	Addictive behavior (Symp.)	Self and ToM (Symp.)
12.20–1.30 PM	Lunch				
1.30–3.10 PM	Evolutionary Cognitive Neuroscience (Symp.)	Modelling the Evolution of Cooperation	New Approaches to Facial Attractiveness	Development and Life-History	Sex and Personality (Symp.)
3.15–4.15 PM	Mark Stoneking, "Maternal and Paternal Histories of Human Populations"				
4.15–4.35 PM	Coffee break				
4.35–6.35 PM	Cultural Transmission	Attractiveness	Depression and Psychopathology	Language Acquisition and Evolution (Symp.)	Competition and Aggression
6.45–9.00 PM	Poster Session				

Sunday, July 25th, 2004

10.00–10.20 AM	Coffee				
10.20 AM–12.20 PM	Costly Signaling and Cooperation	Religion, Morality, and Ethnicity	Idiolectical Approach ®	Attractiveness and Quality	Art, Literature, and Aesthetics

QUICK TIMETABLE

Wednesday, July 21st, 2004

- 5.00 PM** Check-in and onsite-registration, Henry Ford Building, Freie Universität Berlin (FUB)
7.00 PM Welcome mixer (until 9.00 PM)

Thursday, July 22nd, 2004

- 9.00 AM** Morning plenary by Wolfgang Enard – Audimax
10.00 AM Coffee break
10.20 AM Morning sessions
12.20 PM Lunch
1.30 PM Afternoon debate by Gerd Gigerenzer and Keith Stenning – Audimax
1.30 PM Early afternoon sessions
3.15 PM Afternoon plenary by Bernard Comrie – Audimax
4.15 PM Coffee break
4.35 PM Late afternoon sessions
6.45 PM Keynote Talk (Keynote Speaker Peter Hammerstein)
8.00 PM Banquet – Harnack House

Friday, July 23rd, 2004

- 9.00 AM** Morning plenary by Hans Peter Kohler – Audimax
10.00 AM Coffee break
10.20 AM Morning sessions
12.20 PM Lunch
12.20 PM Student member lunch – KS 1
12.20 PM Executive Council Meeting – KS 2
1.30 PM Early afternoon sessions
3.15 PM Afternoon plenary by James Carey – Audimax
4.15 PM Coffee break
4.35 PM Late afternoon sessions
7.00 PM Boat tour (7.00 PM: departure Henry Ford Bau)

Saturday, July 24th, 2004

- 9.00 AM** Morning plenary by R. Dawkins, P. Hammerstein, D. Harper, and E. Szathmáry – Audimax
10.00 AM Coffee break
10.20 AM Morning sessions
12.20 PM Lunch
12.20 PM HBES Member Meeting
1.30 PM Early afternoon sessions
3.15 PM Afternoon plenary by Mark Stoneking – Audimax
4.15 PM Coffee break
4.35 PM Late afternoon sessions
6.45 PM Poster session (Foyer Henry Ford Bau) and announcement of prize winners (until 9.00 PM)

Sunday, July 25th, 2004

- 10.00 AM** Coffee
10.20 AM Morning sessions

DETAILED TIMETABLE

NYI = Paper entered in New Young Investigator Competition

PD = Paper entered in Postdoctoral Researcher Competition

Wednesday, July 21st, 2004

5.00 PM **Check-in and onsite-registration**, Henry Ford Building, Freie Universität Berlin (FUB)

7.00 PM **Welcome mixer (until 9.00 PM)**

Thursday, July 22nd, 2004

Thursday morning sessions

9.00 AM **Morning plenary – Audimax**
Wolfgang Enard
(Max Planck Institute of Evolutionary Anthropology / Dep. of Evolutionary Genetics / Leipzig)
The genetical basis of human language

10.00 AM Coffee break

Cooperation in Large Groups (Symposium)

Chair: Karthik Panchanathan

Audimax

Abstracts: see page 30

10.20 AM	Biele, Rieskamp	<i>Reciprocity, reinforcement learning, and local adaptation learning as models of cooperation in social group dilemmas</i>
10.40 AM	Nakamaru, Iwasa	<i>The different societies result in the different ways of evolving altruistic punishment in the spatial structured population</i>
11.00 AM	Aktipis	<i>When the going gets tough, the nice get going: contingent movement and the evolution of cooperation in groups</i>
11.20 AM	Panchanathan, Boyd	<i>Indirect reciprocity can stabilize cooperation without the second-order free rider problem</i>
11.40 AM	Kameda, Tamura	<i>“To eat or not to be eaten?” Dilemmas between resource-acquisition and risk-monitoring in human groups</i>
12.00 PM	Takahashi, Mashima	<i>The effect of perception errors on the emergence of generalized exchange</i>

Mating Strategies

Chair: Klaus Jaffe

Lecture Hall A

Abstracts: see page 33

- | | | |
|-----------------|--|---|
| 10.20 AM | Minervini, McAndrew | <i>The mating strategies and preferences of mail order brides</i> |
| 10.40 AM | Lawson, Mace | <i>The relationship between sexual orientation and mating strategy in personal advertisements</i> |
| 11.00 AM | Klusmann | <i>Gender-specific changes of sexual motivation with the duration of partnership in younger and older couples</i> |
| 11.20 AM | Quinsey, Provost, Kormos, Kosakoski | <i>Female sociosexuality and preference for male masculinization</i> |
| 11.40 AM | Moore, Cassidy, Smith, Boothroyd, Jones, Perrett | <i>The effects of increasing control of resources on female reproductive strategy and partner preferences</i> |
| 12.00 PM | Jaffe | <i>On the adaptive value of narcissism</i> |

Parental Investment

Chair: Sarah Johns

Lecture Hall B

Abstracts: see page 36

- | | | |
|-----------------|-------------------------------------|---|
| 10.20 AM | Alvergne, Faurie, Raymond | <i>Some physiological and psychological correlates of parental investment</i> |
| 10.40 AM | Jeon | <i>The optimal allocation of parental investment based on offspring age</i> |
| 11.00 AM | Pospasil, Fisher, Hofhansl, Voracek | <i>Spousal age differences and sex differences in life expectancy are confounders of matrilineal biases in kin investment</i> |
| 11.20 AM | Johns | <i>Subjective life expectancy and offspring sex: support for the Trivers-Willard hypothesis</i> |
| 11.40 AM | Webster (NYI) | <i>A non-linear approach to the Trivers-Willard hypothesis: evidence from an archival analysis of inheritance data</i> |
| 12.00 PM | Huber, Linhartova, Cope, Lacy | <i>Paternal certainty, descent, post-marital residence, and level of birth-related investment</i> |

Individual Differences in Life-History Strategies (Symposium)

Chair: Aurelio José Figueredo

Lecture Hall C

Abstracts: see page 39

- | | | |
|-----------------|---|--|
| 10.20 AM | Rushton, Bons | <i>A test of r-K life history theory across 234 mammalian species</i> |
| 10.40 AM | Figueredo, Vasquez, Brumbach, Schneider | <i>The K-Factor, covitality, and personality: a psychometric test of life history theory</i> |
| 11.00 AM | Guggenheim, Davis, Figueredo | <i>Sex-biased parental investment in a cross-cultural sample of 35 countries</i> |
| 11.20 AM | Sefcek, Vasquez, Wolf, Kirsner, Figueredo, Jacobs | <i>Does life history strategy account for phenotypic variation in human mental and physical traits?</i> |
| 11.40 AM | Miller | <i>Fitness indicator theory predicts genetic correlation patterns among intelligence and personality traits in 2,144 pairs of British 7-year-old twins</i> |

Media, Gossip and Human Universals (Symposium)

Chair: Charlotte de Backer

Lecture Hall B

Abstracts: see page 47

- | | | |
|----------------|-------------------|---|
| 1.30 PM | Barkow | <i>Accidental learning at the movies</i> |
| 1.50 PM | Hejl, Uhl, Kammer | <i>The really interesting stories are the old ones. Evolved interests in economically successful films from Hollywood and Bollywood</i> |
| 2.10 PM | Kanazawa | <i>Bowling with your imaginary friends may depend on your general intelligence</i> |
| 2.30 PM | Steen | <i>Entertaining strategy learning</i> |
| 2.50 PM | Davis | <i>Recurrent themes in popular culture are an inevitable result of mental evolution</i> |

Brain and Cognition

Chair: Steven Platek

Lecture Hall C

Abstracts: see page 50

- | | | |
|----------------|--|---|
| 1.30 PM | Platek, Levin, Mohamed, Myers, Raines, Fonteyn, Panyavin, Thomson, Bonaiuto, Mitman, Arigo | <i>Do males and females use the same brain region to process different types of spatial information: FMRI investigation of sexually differentiated spatial skills</i> |
| 1.50 PM | Faurie, Raymond | <i>Polymorphism of handedness and socio-economic status in western societies</i> |
| 2.10 PM | Goos (NYI) | <i>Measuring the influence of genomic imprinting on human brain development via intra-familial correlations</i> |
| 2.30 PM | Uller | <i>An evolved cognitive system: the case of number</i> |
| 2.50 PM | Kornienko | <i>A cognitive basis for cardinal utility</i> |

Kinship

Chair: X. T. Wang

Lecture Hall D

Abstracts: see page 53

- | | | |
|----------------|------------------|--|
| 1.30 PM | Newson | <i>Why do people who are close to their relatives have more children?</i> |
| 1.50 PM | Wang, Savina | <i>Kinship, ethnicity and sex: a russian study of risk taking</i> |
| 2.10 PM | DeBruine | <i>Context-specific effects of facial resemblance on trustworthiness and sexual attractiveness</i> |
| 2.30 PM | Steadman, Palmer | <i>The identification of distant kin</i> |
| 2.50 PM | Zaatari | <i>Kinship and ultimatum decisions</i> |

- 3.15 PM** **Afternoon plenary – Audimax**
Bernard Comrie
(Max Planck Institute of Evolutionary Anthropology / Department of Linguistics / Leipzig):
Languages and Genes, Inheritance and Replacement

- 4.15 PM** Coffee break

Remembering What Linda Mealey Said (Symposium)

Chair: Nancy Segal

Audimax

Abstracts: see page 55

4.35 PM	Segal	<i>Twin studies and evolutionary psychology: overview of Linda Mealeys's life and work</i>
4.55 PM	Gardner	<i>Sex difference research: mealey's search for female-male comparisons</i>
5.15 PM	Thomson	<i>Linda Mealey's clinical legacy</i>
5.35 PM	Mueller	<i>Discussant</i>
5.55 PM	Kohler	<i>Discussant</i>
6.15 PM		<i>Discussion</i>

Mate Preferences I

Chair: Boguslaw Pawlowski

Lecture Hall A

Abstracts: see page 57

4.35 PM	Pillsworth, Haselton	<i>The object of desire: male sexual attractiveness moderates ovulatory shifts in women's in-pair and extra-pair desires</i>
4.55 PM	Campbell	<i>Are the traits we prefer in potential mates the traits they value in themselves? An analysis of gender differences in the self-concept</i>
5.15 PM	Lazarus, Thorogood	<i>Choosing a mate on two dimensions: trade-offs, isoclines and age effects</i>
5.35 PM	Pawlowski	<i>Using drawings of pairs showing different degrees of sexual dimorphism in height (SDH) in a new method for detecting mate preferences</i>
5.55 PM	Pashos	<i>Do all women favor high-status men? New results on sex and educational differences in mating preferences</i>
6.15 PM	McPherson, Hughes, Stewart	<i>The ideal (wo)man: similarities and differences in opposite sex attraction</i>

Media, Gossip and Human Universals (Symposium) / ToM and Culture

Chairs: Charlotte de Backer / Lisa Zunshine

Lecture Hall B

Abstracts: see page 60

4.35 PM	Schwender	<i>Daytime talk shows as virtual gossip groups</i>
4.55 PM	De Backer	<i>Is Pamela Anderson dying from hepatitis C? Tabloids: a cheap means to gather life experience</i>
5.15 PM	McAndrew	<i>Why is gossip so irresistible? explorations in the evolutionary psychology of gossip</i>
5.35 PM	Barrett	<i>Death understanding in a meat-eating primate</i>
5.55 PM	Hirschfeld	<i>Does the autistic child have a theory of society? An evolved, special-purpose capacity for human sociality</i>
6.15 PM	Zunshine	<i>Why do we read fiction?</i>

Fertility and Fitness

Chair: Jeffrey Schank

Lecture Hall C

Abstracts: see page 63

- 4.35 PM** Deady, Smith, Kent, Dunbar *Institutionalised celibacy as an adaptive strategy: evidence from an historical Irish population*
- 4.55 PM** Gurmu, Mace *Fertility transition driven by poverty: the case of Addis Ababa, Ethiopia*
- 5.15 PM** Sear, Mace, McGregor *Height, marriage and reproductive success: how a gambian population compares to the west*
- 5.35 PM** Abrams, Weeden, Green, Sabini *Social status and fertility in the contemporary U.S*
- 5.55 PM** Yang, Schank, Yang, Xu, Qu, Yu, Zhou *A reevaluation of menstrual synchrony*

Personality / Adaptive Functions of Memory

Chairs: Daniel Nettle / Ulrich Hoffrage

Lecture Hall D

Abstracts: see page 65

- 4.35 PM** Nettle *Personality as life-history strategy: The fitness benefits and costs of individual differences in extraversion*
- 4.55 PM** Penke *High genetic variance in general intelligence (g) endophenotypes: Evidence in favor of a fitness indicator interpretation*
- 5.15 PM** Funder *The personality judgment instinct*
- 5.35 PM** Schooler, Hertwig *How forgetting benefits heuristic inference*
- 5.55 PM** Hoffrage, Hertwig *The hindsight bias as a by-product of an adaptive memory mechanism*
- 6.15 PM** Hertwig *In experienced-based decision making, men behave like bumblebees*
- 6.45 PM** **Keynote Talk**
Keynote Speaker Peter Hammerstein
(Institute for Theoretical Biology, Humboldt University, Berlin)
- 8.00 PM** **Banquet – Harnack House**

Friday, July 23rd, 2004

Friday morning sessions

- 9.00 AM** **Morning plenary – Audimax**
Hans Peter Kohler
(Population Studies Center, University of Pennsylvania)
Genetics and the Biodemography of Fertility

- 10.00 AM** Coffee break

Female Competition (Symposium)

Chair: Stacey Rucas

Audimax

Abstracts: see page 68

10.20 AM	Hess	<i>Evolved sex differences in aggression types: inclinations towards physical vs. reputational attacks</i>
10.40 AM	Cashdan	<i>Why female hierarchies are less stable</i>
11.00 AM	Benenson	<i>Female competition- different strategies and targets</i>
11.20 AM	Evans	<i>Status and alliances: female ally-making behavior</i>
11.40 AM	Rucas, Kaplan, Gurven, Winking, Crespo	<i>Life history changes in resource competition among Tsimane women and girls</i>
12.00 PM		<i>Discussion</i>

Philosophical Critics (Symposium)

Chair: Eouard Machery

Lecture Hall A

Abstracts: see page 70

10.20 AM	Machery	<i>Evolution and learning</i>
10.40 AM	Samuels	<i>Massive modularity and the problem of flexibility</i>
11.00 AM	Dupre	<i>Why evolution tells us so little about human nature</i>
11.20 AM	Poirie, Faucher, Lachapelle	<i>The concept of innateness and the destiny of evolutionary psychology</i>
11.40 AM	Barrett	<i>Discussant</i>
12.00 PM		<i>Discussion</i>

Is Depression an Adaptation?

Chair: Ed Hagen

Lecture Hall B

Abstracts: see page 73

10.20 AM	Pillmann	<i>How depressed affect modulates self-reported action tendencies – results of a pilot study</i>
10.40 AM	Hagen	<i>Suicidality as a bargaining strategy</i>
11.00 AM	Turner, McAndrew	<i>A laboratory simulation of Hagen's defection hypothesis: determining the role of future reproductive opportunity and offspring quality in parental investment</i>
11.20 AM	Binser (NYI)	<i>„Sadder but Fitter“. The evolutionary function of depressive symptoms following fetal loss</i>
11.40 AM	Thomson, Hagen, Watson, Andrews	<i>Captain Robert FitzRoy's Darwinian Depression</i>
12.00 PM	Badcock, Allen	<i>Personality, mood, and domains of risk-taking</i>

Mate Preferences II

Chair: Karl Grammer

Lecture Hall C

Abstracts: see page 75

10.20 AM	Clark	<i>Cues of receptivity influence judgements of attractiveness</i>
10.40 AM	Roberts, Gosling, Petrie	<i>Revisiting MHC preferences and effects of oral contraception</i>
11.00 AM	Grammer, Fink, Dorfman, Butovskaya, Bechinie	<i>Dance to your own beat: the communication of personality and honest signalling</i>
11.20 AM	Bressler	<i>Evidence for humor as a sexually-selected trait</i>
11.40 AM	Sergeant (NYI)	<i>Olfaction and female mate choice</i>
12.00 PM	Chu, Willis, Lycett, Dunbar	<i>Human males use olfactory cues to detect ovulation</i>

Signals and Sentiments (Symposium)

Chair: Tim Ketelaar

Lecture Hall D

Abstracts: see page 78

10.20 AM	Ketelaar	<i>Emotions as signals and sentiments: a brief history and some recent empirical evidence</i>
10.40 AM	Zeelenberg	<i>Feeling is for doing: a pragmatic approach to the study of emotions in economic behavior</i>
11.00 AM	Kurzban, O'Brien, Malmgren-Samuel, Tusen, Weissberger	<i>Third-party punishment: punitive sentiment or reputation?</i>
11.20 AM	Haley, Fessler	<i>Foolish slaves or wise masters: the relationship between social emotions and cooperative behavior</i>
11.40 AM	Wang	<i>Discussant</i>
12.00 PM		<i>Discussion</i>
12.20 PM	Lunch	
12.20 PM	Student member lunch – KS 1	
12.20 PM	Executive Council Meeting – KS 2	

Friday afternoon sessions

Determinants of Norms of Cooperation (Symposium)

Chair: Simon Gächter

Audimax

Abstracts: see page 80

1.30 PM	Carpenter, Matthews	<i>Social reciprocity</i>
1.50 PM	Güerker, Irlenbusch, Rockenbach	<i>Endogenous institution selection in public goods</i>
2.10 PM	Gächter, Herrmann	<i>Norms of cooperation among urban and rural dwellers: experimental evidence from Russia</i>
2.30 PM	Kosfeld, Fehr, Fischbacher, Spitzer	<i>Cooperation and punishment with antisocial personality disordered criminals</i>
2.50 PM		<i>Discussion</i>

Mutual Mate Preference (Symposium)

Chair: Peter Todd

Lecture Hall A

Abstracts: see page 82

1.30 PM	Todd, Fasolo, Lenton	<i>Testing patterns of mate preferences via actual choices</i>
1.50 PM	Lenton, Fasolo, Todd	<i>The (mate) value of fastdating</i>
2.10 PM	Fasolo, Lenton, Todd	<i>'Shopping' for a mate: is less more?</i>
2.30 PM	Wilke, Todd, Hutchinson, Kruger	<i>Risk-taking behavior as a cue in mate choice: a cross-cultural study</i>
2.50 PM		<i>Discussion</i>

New Approaches to Physical Attractiveness

Chair: Nicholas Pound

Lecture Hall B

Abstracts: see page 85

1.30 PM	Schützwohl	<i>Male judgments of female waist-to-hip ratios: new insights with a new experimental paradigm</i>
1.50 PM	Pound, Penton-Voak	<i>A new technique for assessing facial masculinity</i>
2.10 PM	Mennucci, Riccardo, Cellerino	<i>What is an average shape and what is an average texture? The caveats of using morphing programmes to create "average" faces</i>
2.30 PM	Cornelissen, Smith, Hancock, Tovée	<i>An atheoretical approach to explaining female physical attractiveness does 50% better than theory</i>
2.50 PM	Cooper, Maurer	<i>The Effects of short-term experience on judgments of attractiveness</i>

Emotion

Chair: Robert Aunger

Lecture Hall C

Abstracts: see page 87

1.30 PM	Hofhansl, Voracek, Vitouch	<i>Sex differences in jealousy: a meta-analytical reconsideration</i>
1.50 PM	Demps, Fessler, Snyder	<i>Exploring the origins of the sex difference in disgust sensitivity: a test of the male signaling hypothesis</i>
2.10 PM	Grinde	<i>An evolutionary approach to uncover child-rearing practices that contribute to the prevalence of anxiety disorders</i>
2.30 PM	Aunger, Curtis	<i>Niche complexity, emotions and the evolution of nervous systems</i>
2.50 PM	Soares, Esteves, Flykt	<i>Attention and fear: does fearful stimuli drive attention?</i>

Evolution and Cognition (Symposium)

Chair: Clark Barrett

Lecture Hall D

Abstracts: see page 89

- 1.30 PM** Dickins (PR) *Evolutionary theory: even social constructionism requires it*
- 1.50 PM** Brase *Frequency is as frequency does: when do people represent statistical information as frequencies?*
- 2.10 PM** Flamson *Why you had to be there: towards a computational model of humor-as-encryption*
- 2.30 PM** Behne *A developmental and comparative view on aspects of infant social cognition*
- 2.50 PM** *Discussion*
- 3.15 PM** **Afternoon plenary – Audimax**
James Carey
(Biodemographic Determinants of Life Span Program, University of California, Davis;
Center for the Economics and Demography of Aging, University of California, Berkeley)
The evolution of human longevity
- 4.15 PM** Coffee break

Consumer Behavior (Symposium)

Chair: Siegfried Dewitte

Audimax

Abstracts: see page 91

- 4.35 PM** Vyncke *Rokeach revisited: the concept of values*
- 4.55 PM** Vantomme, Geuens, De Houwer, De Pelsmacker *Explicit and implicit attitudes towards advertisements portraying men in different roles*
- 5.15 PM** Poels *The impact of motivational appeals on emotional advertising processing*
- 5.35 PM** Pandelaere, Dewitte, Warlop *Spending hurts but may yield future returns. Two simple heuristics underlying the decision to spend*
- 5.55 PM** Delmotte *The fitnessindicator applied to brands. A Darwinistic model on brandresearch*
- 6.15 PM** *Discussion*

Grandparental Investment (Symposium)

Chair: Harald Euler

Lecture Hall A

Abstracts: see page 94

- 4.35 PM** Beise *The helping and the helpful grandmother - the role of maternal and paternal grandmothers in child mortality in historic Quebec*
- 4.55 PM** Ragsdale *Grandmothering in Cambridgeshire, 1770-1861*
- 5.15 PM** Kemkes-Grottenthaler *Does grandpa matter? Grandpaternal investment and offspring survival*
- 5.35 PM** Leonetti, Nath, Hemam *Grandmother effects on marital stability among the Khasi of N.E. India*

- 5.55 PM Euler *Grandparental solicitude and parent sibling constellation*
- 6.15 PM *Discussion*

Evolutionary Thinking in Sociology (Symposium)

Chair: Rosemary Hopcroft

Lecture Hall B

Abstracts: see page 97

- 4.35 PM Kohler *Partner + Children = Happiness? An assessment of the effect of fertility and partnerships on subjective well-being in danish twins*
- 4.55 PM Cunningham *Social class & fertility in post-demographic transition america: an evolutionary analysis*
- 5.15 PM Kanazawa *Where do cultures come from?*
- 5.35 PM Crippen *The fragile foundation*
- 5.55 PM Hopcroft *Those who can do: sex, status and reproductive success in the contemporary U.S.*
- 6.15 PM *Discussion*

New Perspectives in Darwinian History (Symposium)

Chair: Walter Scheidel

Lecture Hall C

Abstracts: see page 99

- 4.35 PM Betzig *Politics and sex in the bible*
- 4.55 PM Wettlaufer *History, Culture and evolution. New perspectives in Darwinian history*
- 5.15 PM Hakami *Fitness: inclusive or infrastructural?*
- 5.35 PM Scheidel *Is Darwinian history possible?*
- 5.55 PM *Discussion*

Evolutionary Psychology and the Social Sciences

Chair: Julie Coultas

Lecture Hall D

Abstracts: see page 101

- 4.35 PM Efferson *Dynamic coupling: economic growth and population biology*
- 4.55 PM Coultas *Smart mobs: is this where e-learning meets evolutionary social psychology?*
- 5.15 PM Colarelli, Souza, Bapat, Yang *A cross-national comparison of affirmative action programs from evolutionary and cultural perspectives*
- 5.35 PM Lablanc *N. N.*
- 5.55 PM Leron *Mathematical thinking and human nature: consonance and conflict*
- 6.15 PM Walsh *Major correlates of crime through an evolutionary lens*

- 7.00 PM Boat tour (7.00 PM: departure Henry Ford Bau)

Saturday morning sessions

9.00 AM Morning plenary – Audimax
Richard Dawkins (1), Peter Hammerstein (2), David Harper (3), and Eörs Szathmáry (4)
[(1) Charles Simonyi Chair of the Public Understanding of Science, Oxford University; (2) Institute for Theoretical Biology, Humboldt University; (3) School of Life Sciences, University of Sussex; (4) Department of Plant Taxonomy and Ecology, Eötvös Loránd University]
Memorial for John Maynard Smith

10.00 AM Coffee break

Open Problems in Theoretical Biology

Chair: Peter Hammerstein

Audimax

10.20 AM Harper *Rituals in non-human animals: clues about the origins of religion?*
11.00 AM Szathmáry *The evolution of language*
11.40 AM Hammerstein *Discussant*
12.00 PM *Discussion*

Language and Speech

Chair: Clare Holden

Lecture Hall A

Abstracts: see page 104

10.20 AM Putz (NYI) *Women's preferences for men's voices vary cyclically with conception risk and predicted hormone levels*
10.40 AM Bryant *The functional organization of vocal physiology for pitch production*
11.00 AM Yamauchi *Baldwinian niche construction- a new perspective on language evolution*
11.20 AM Holden, CGray *The evolution of bantu languages: trees and network models*
11.40 AM Fortunato, Holden, Mace *Phylogenetic analysis of marital composition and mode of marriage in the Indo-European language family*
12.00 PM Gontier (NYI) *Language and genes - would someone please pull the breaks*

Cooperation and Punishment (Symposium)

Chair: Michael Price

Lecture Hall B

Abstracts: see page 107

10.20 AM Price (PR) *Monitoring, reputation, and "green beard" cooperation in a Shuar workgroup*
10.40 AM Gibson *Is guilt an adaptation for maintaining cooperative*

		<i>relationships?</i>
11.00 AM	Barclay	<i>Do altruistic punishers receive social benefits? Testing for within-group benefits</i>
11.20 AM	Shinada, Yamagishi, Ohmura	<i>Altruistic punishment as group-based cooperation</i>
11.40 AM	Gaechter, Herrmann	<i>A cross-cultural study of emotions in social dilemmas</i>
12.00 PM	Kurzban	<i>Discussant</i>

Addictive Behavior (Symposium)

Chair: David Newlin

Lecture Hall C

Abstracts: see page 110

10.20 AM	Higley, Gerald, Barr, Newman, Suomi, Schwandt	<i>Potential ultimate and proximal variables contributing to alcoholism: a nonhuman primate model</i>
10.40 AM	Guisinger	<i>Adaptations to flee from famine in anorexia nervosa may be addictive</i>
11.00 AM	Newlin	<i>The self-perceived survival ability and reproductive fitness (SPFit) theory of substance use disorders: control theory, psychobiological drug responses, and the end of "reward", "reinforcement", and "euphoria"</i>
11.20 PM	Gardner, Jr.	<i>Discussant</i>
11.40 PM	Thomson	<i>Discussant</i>
12.00 PM		<i>Discussion</i>

Self and ToM (Symposium)

Chair: Farah Focquaert

Lecture Hall D

Abstracts: see page 112

10.20 AM	Hare	<i>Emotional chimpanzees, domesticated foxes, and the evolution of human social cognition</i>
10.40 AM	Mitchell	<i>The self and other minds, kinesthetic-visual matching, and children's thinking about pretense and false belief</i>
11.00 AM	Cattigan	<i>I/Mine - You/Yours: notions of self and other required for the operation of a biological market in chimpanzees pan troglodytes</i>
11.20 AM	Focquaert	<i>On the adaptive importance of a 'representational mind' for SELF and ToM</i>
11.40 AM		<i>Discussion</i>
12.20 PM	Lunch	
12.20 PM	HBES Member Meeting	

Saturday afternoon sessions

Evolutionary Cognitive Neuroscience (Symposium)

Chair: Julian Paul Keenan

Audimax

Abstracts: see page 114

- | | | |
|---------|--|---|
| 1.30 PM | Malcolm, Barnacz, Guise, Johnson, Keenan | <i>Theory of mind and self-awareness: The evolutionary role of deception and the right hemisphere</i> |
| 1.50 PM | Platek, Keenan, Mohamed | <i>Whose your daddy? Sex differences in neural correlates of paternal resemblance</i> |
| 2.10 PM | Goel, Fisher, Vartanian, Lam | <i>The rewarding nature of perceived facial attractiveness</i> |
| 2.30 PM | Northoff | <i>The evolution of subjective experience and cortical midline structures</i> |
| 2.50 PM | | <i>Discussion</i> |

Modelling the Evolution of Cooperation

Chair: Masanori Takezawa

Lecture Hall A

Abstracts: see page 117

- | | | |
|---------|----------------------------|--|
| 1.30 PM | McGuire | <i>The evolution of human helping: cutting the gordian knot and reweaving the strands</i> |
| 1.50 PM | Takezawa, McElreath | <i>Punishment and cooperation: what lacks in evolutionary game theoretical models of human cooperation?</i> |
| 2.10 PM | Mashima, Takahashi | <i>The function of exchange: comparison between the effect of experiencing generalized exchange and that of experiencing restricted exchange on behaviors in social dilemmas</i> |
| 2.30 PM | Roberts, Atkinson | <i>Experience versus observation: the evolution of direct and indirect reciprocity</i> |
| 2.50 PM | Farrelly, Lazarus, Roberts | <i>Human cooperation as courtship display: an empirical study of the role of partner gender and attractiveness in cooperative decision-making</i> |

New Approaches to Facial Attractiveness

Chair: Horst Dieter Steklis

Lecture Hall B

Abstracts: see page 119

- | | | |
|---------|--|---|
| 1.30 PM | Jacobson, Steklis, Steklis, LeClair, Fawcett | <i>Exploring the application of human facial fluctuating asymmetry methodology in a great ape</i> |
| 1.50 PM | Tartarelli, Valenzano, Mennucci, Cellerino | <i>A new perspective on the evolution of human specific facial traits</i> |
| 2.10 PM | Cellerino, Valenzano, Tartarelli, Mennucci | <i>Shape analysis of female facial attractiveness</i> |
| 2.30 PM | Chang, Bruce, Penton-Voak, | <i>Sex-typicality and attractiveness in dynamic stimuli</i> |
| 2.50 PM | Feinberg, Jones, DeBruine, Little, Cornwell, Boothroyd, Stirrat, Perrett | <i>Women's pitch of voice and facial-metric masculinity correlate: implications for reproductive strategy</i> |

Development and Life-History

Chair: Ulrich Mueller

Lecture Hall C

Abstracts: see page 122

- | | | |
|----------------|-----------------------|---|
| 1.30 PM | Blum, Gaulin | <i>Delayed dispersal in humans: effects of family circumstances on dispersal timing</i> |
| 1.50 PM | Bernhard, Oberzaucher | <i>The impact of patrilocality on human social behavior</i> |
| 2.10 PM | Mueller | <i>A child later in life is not a life prolonging event. Findings from the european royalty (1683-1939)</i> |
| 2.30 PM | Lycett | <i>Sex differences in ageing: why women live longer</i> |
| 2.50 PM | Campbell | <i>The socioecology of Adrenarche</i> |

Sex and Personality (Symposium)

Chair: Aurelio José Figueredo

Lecture Hall D

Abstracts: see page 124

- | | | |
|----------------|---|---|
| 1.30 PM | Egan, Angus | <i>Is social dominance a sex-specific strategy for infidelity?</i> |
| 1.50 PM | Jones, Sefcek, JFigueredo | <i>The ideal romantic partner personality</i> |
| 2.10 PM | Kirsner, Figueredo, Jacobs | <i>Negative affect, perceived mate values, and mate retention behaviors</i> |
| 2.30 PM | Vasquez | <i>Female mating preference, negative affect, and risk attitudes</i> |
| 2.50 PM | | <i>Discussion</i> |
| 3.15 PM | Afternoon plenary – Audimax
Mark Stoneking
(Max Planck Institute of Evolutionary Anthropology / Department of Molecular Anthropology / Leipzig)
<i>Maternal and paternal histories of human populations</i> | |

- 4.15 PM** Coffee break

Cultural Transmission

Chair: Ruth Mace

Audimax

Abstracts: see page 126

- | | | |
|----------------|-------------------------------------|---|
| 4.35 PM | Plourde | <i>Linking cultural evolution theory, evolutionary psychology, and the archaeological record: a model of the evolution of prestige goods and increasing sociopolitical complexity</i> |
| 4.55 PM | Mace, Allal, Sear, Prentice | <i>The uptake of modern contraception in a gambian village: the spread of a cultural innovation over 25 years</i> |
| 5.15 PM | Richerson, Baum, Efferson, Paciotti | <i>Cultural evolution in laboratory microsocieties</i> |
| 5.35 AM | Bennis | <i>Naturally selected cognitive traits, culturally selected niches, and the problem of casino gambling</i> |
| 5.55 AM | Perry | <i>Social conventions in wild capuchin monkeys: zahavian bonding rituals?</i> |
| 6.15 PM | Kydd | <i>Cultural transmission forces in supernatural niche construction</i> |

Attractiveness

Chair: R. Elisabeth Cornwell

Lecture Hall A

Abstracts: see page 129

- | | | |
|----------------|--|--|
| 4.35 PM | Smith, Deady | <i>Shifting male preferences for female body type: an adaptive response to a changing western socioeconomic environment?</i> |
| 4.55 PM | Jones (NYI) | <i>Pregnancy and menstrual cycle alter attraction to apparent health in faces</i> |
| 5.15 PM | Oberzaucher, Grammer | <i>The role of similarity at different stages of developing friendships</i> |
| 5.35 PM | Valenzano, Tartarelli, Mennucci, Cellerino | <i>Evidence for the existence of two alternative perceptions of male facial attractiveness</i> |
| 5.55 PM | Hönekopp, Rudolph, Beier, Liebert, Müller | <i>Physical attractiveness, athletic ability, and sex hormones in males</i> |
| 6.15 PM | Cornwell, Boothroyd, DeBruine, Feinberg, Jones, Moore, Law-Smith, Stirrat, Pitman, Whiten, Perrett | <i>Developmental influences on mate choice in young adults</i> |

Depression and Psychopathology

Chair: Rosemary Hopcroft

Lecture Hall B

Abstracts: see page 132

- | | | |
|----------------|--------------------|---|
| 4.35 PM | Allen, Bailey | <i>The relation of depression to mating and sexual behaviours</i> |
| 4.55 PM | Fisher, Thomson | <i>Do the sexual side-effects of antidepressants jeopardize romantic love and marriage?</i> |
| 5.15 PM | McGowan | <i>Depression, investment and breastfeeding: an evolutionary analysis of motherhood</i> |
| 5.35 PM | Hopcroft, Bradley | <i>Between nature and culture: women and depression across 26 countries</i> |
| 5.55 PM | De Block, Adriaens | <i>Adaptation and dysfunction: a Darwinian psychodynamics of paranoid schizophrenia</i> |
| 6.15 PM | Richer | <i>The rise of psychosocial problems, attachment and mismatch</i> |

Language Acquisition and Evolution (Symposium)

Chair: Paul Vogt

Lecture Hall C

Abstracts: see page 135

- | | | |
|----------------|-------------|--|
| 4.35 PM | Belpaeme | <i>Innateness of colour categories is a red herring: insights from computational modelling</i> |
| 4.55 PM | de Boer | <i>Acquisition and the evolution of speech</i> |
| 5.15 PM | Livingstone | <i>Language acquisition and diversity: the evolution of dialects</i> |
| 5.35 PM | Smith | <i>Inferential communication as a driving force in the acquisition and evolution of language</i> |
| 5.55 PM | Vogt | <i>Acquisition mechanisms to discover linguistic structures</i> |

6.15 PM

Discussion

Competition and Aggression

Chair: Detlef Fetchenhauer

Lecture Hall D

Abstracts: see page 138

- 4.35 PM** Fisher, MacDonald *A qualitative exploration of strategies for intrasexual competition*
- 4.55 PM** Buss, Duntley *Why it's bad to be dead: The evolution of adaptations to prevent being murdered*
- 5.15 PM** Fetchenhauer *Mating strategies and preference for dominant men as determinants of females' sexual victimizations*
- 5.35 PM** van de Wetering *Defamatory techniques in interpersonal accounts*
- 5.55 PM** Mercier, Van der Henst *What credit do we give to information coming from others?*
- 6.15 PM** Manson, Gros-Louis, Perry *Lethal coalitional aggression in wild capuchin monkeys: implications for the evolution of warfare*

6.45 PM Poster session and announcement of prize winners (until 9.00 PM)

Sunday, July 25th, 2004

Sunday morning sessions

10.00 AM Coffee

Costly Signaling and Cooperation

Chair: Elizabeth Cashdan

Audimax

Abstracts: see page 141

- 10.20 AM** Dewitte, de Cremer *Give and you shall receive. Give more and you shall be honored. Experimental evidence for altruism as costly signaling*
- 10.40 AM** Millet, Dewitte, Warlop *The altruist in a public good game: hero or zero?*
- 11.00 AM** Higgins, Ward, Cashdan *The nature of virtue in social Interactions: costly signaling or reciprocity and sympathy?*
- 11.20 AM** Ziker *Hunter status and reproductive success in northern siberia*
- 11.40 AM** Hopkins *All must have prizes? Tournaments, matching and inequality*
- 12.00 PM** Arora *Explaining altruism: why we give time and money to strangers*

Religion, Morality, and Ethnicity

Chair: Mark C. Mescher

Lecture Hall A

Abstracts: see page 144

- | | | |
|-----------------|------------------|---|
| 10.20 AM | Mescher, Kurland | <i>The consilience of religion and science: an evolutionary perspective, part 1</i> |
| 10.40 AM | Goldberg | <i>Making biological sense of religious sacrifice</i> |
| 11.00 AM | Strohming | <i>Humean, all too humane: free will, folk morality, and the deterrence paradox</i> |
| 11.20 PM | Salter | <i>Richard Dawkins' misunderstanding of kin selection and the delay in quantifying ethnic kinship</i> |

Idiolectical Approach[®]

Chair: Horst Poimann

Lecture Hall B

Abstracts: see page 146

- | | | |
|-----------------|------------------|--|
| 10.20 AM | Poimann, Winkler | <i>Lecture: Archaic relics and the idiolectical approach to psychotherapy - practical implications of evolutionary concepts in psychosomatic and psychotherapeutic interventions</i> |
| 10.40 AM | Poimann, Winkler | <i>Archaic relics and the idiolectical approach to psychotherapy – live</i> |

Attractiveness and Quality

Chair: Kathryn L. Smith

Lecture Hall C

Abstracts: see page 147

- | | | |
|-----------------|--|---|
| 10.20 AM | Havlicek, Roberts, Flegr, Hruskova, Little, Jones, Perrett, Petrie | <i>Female facial attractiveness increases during the fertile phase of the menstrual cycle</i> |
| 10.40 AM | Boothroyd (NYI) | <i>Facial, bodily and hormonal correlates of father absence</i> |
| 11.00 AM | Wigington, Campbell, Cronk, Simpson, Milroy, Wilson | <i>Do women's faces honestly signal long-term Mmate quality?</i> |
| 11.20 AM | Smith, Cornelissen, Tovée | <i>Is Attractiveness really a measure of underlying health?</i> |
| 11.40 AM | Jasienska, Ziomkiewicz, Thune, Ellison | <i>Waist to hip ratio and breast size as the honest signals of woman's reproductive value</i> |
| 12.00 PM | Steklis, Jacobson, Dabbs | <i>Facial symmetry and testosterone in a sample of young men and women</i> |

Art, Literature, and Aesthetics

Chair: Ellen Dissanayake

Lecture Hall D

Abstracts: see page 150

- | | | |
|-----------------|-------------------------|---|
| 10.20 AM | Carroll, Gottschall | <i>Content analysis, human nature, and deviation from the norm in victorian novels</i> |
| 10.40 AM | Kruger, Fisher, Jobling | <i>Dads and cads: alternative male mating strategies and female preferences for literary characters</i> |

11.00 AM	Dissanayake	<i>Of what is art a costly signal?</i>
11.20 AM	Atzwanger, Buber, Gardner, Gruber, Ruso	<i>More than the sum of its parts: environmental stimuli and human behaviour</i>
11.40 AM	Saunders	<i>Male reproductive strategies and parental investment in Sherwood Anderson's "the untold lie"</i>
12.00 PM	Dinev	<i>Evolution, brain and arts</i>

POSTER SESSION

Saturday, July 24th, 2004, 6.45–9.00 PM

- | | | |
|----|--|---|
| 01 | Allen, Bailey | <i>Reproductive strategy and reproductive tactics: an exploratory factor analysis in young women</i> |
| 02 | Atmaca | <i>Music: a sexual cue in mate choice? - Clues from an internet dating service</i> |
| 03 | Baptista, Lory, Carvalho | <i>Sexual and emotional jealousy: adaptation or measurement error</i> |
| 04 | Bateson, Sainthouse, Smith, Hancock, Tovée | <i>Contextual effects in judgments of attractiveness</i> |
| 05 | Beahrs | <i>Evolution from quanta to minds: the intermediate role of classical reality</i> |
| 06 | Benz, Miller, Mandernach | <i>The perceived consequences of infidelity: gender differences</i> |
| 07 | Bernhard | <i>The human mating system — an approach based on cranial sexual dimorphism</i> |
| 08 | Betsch | <i>Symmetry preference in unfamiliar human faces</i> |
| 09 | Blantar, Grammer, Oberzaucher | <i>Changes in personal attributes due to facial surgery</i> |
| 10 | Brewer, Manning, Szwed | <i>Right-left differences in digit ratio and their relationship to fertility in women</i> |
| 11 | Bridgeman, Hahn | <i>How attractive am I? Self-ratings of attractiveness correlate with the ratings of others</i> |
| 12 | Brown, Cardella, Houserman | <i>Kin altruism and attractiveness: a relationship</i> |
| 13 | Brown, Cardella, Houserman | <i>Seek attractive or avoid ugly: possible adaptations in perception of attractiveness</i> |
| 14 | Carvalho, Baptista | <i>Same stresses, different responses: fight or flight and tend and be friend</i> |
| 15 | Chang | <i>Asian evidence for differential parental investment from grandparents</i> |
| 16 | Curtis, Aunger | <i>Disgust: a model system for integrating perspectives on emotion</i> |
| 17 | Cvorovic | <i>Caste among gypsies in serbia: it's our blood that makes us roma</i> |
| 18 | De Cruz | <i>Tools, cumulative culture, and the human cultural niche</i> |
| 19 | McPherson, Hughes, Stewart | <i>(S)He looks nice!: measuring opposite sex attraction</i> |
| 20 | Eng, Fessler, Haley | <i>The effects of hunger on disgust sensitivity</i> |
| 21 | Exner | <i>Why we travel – human mobility in an evolutionary perspective</i> |
| 22 | Fuerlinger | <i>On the primacy of biological motion (perception)</i> |
| 23 | Garcia-Rubio, Nieto, Balderas | <i>Use of perceptual scales, K-means and EM clustering on infant cry classification; additional support for infant cry as a graded signal</i> |
| 24 | George, Cornelissen, Tovee | <i>The perception of female physical attractiveness with changing observer age</i> |
| 25 | Green, Erdos, Tovée | <i>Has natural selection shaped our purchase decisions?</i> |
| 26 | Hancock, French, Tovee | <i>Size not shape predicts female body attractiveness</i> |

27	Hardy, Vugt	<i>From Charles Darwin to David Beckham-the evolution of human status</i>
28	Hassebrauck, Denk	<i>Effects of female fertility risk and relationship status on self-perception of attractiveness and dress style</i>
29	Hill	<i>Education effects of restoration options– rational man versus the savannah hypothesis</i>
30	Hiraishi, Cosmides, Tooby	<i>Out-group exclusion or cheater detection? When two problems coexist</i>
31	Hodges	<i>The effect of facial expressiveness on perceptions of physical and interpersonal attractiveness</i>
32	Horstmann	<i>What do facial “expressions of emotion” convey? Evidence from free responses</i>
33	Hrgovic	<i>Forever yours: a content analysis of mate choice differences in personal ads for long-term marriage partners</i>
34	Hromatko, Tadinac	<i>The structure of sex differences in preferences for long-term and short-term mates</i>
35	Husárová, Grammer, Pospíšil	<i>Human male mate guarding and its link to female fertility status</i>
36	Jasienski, Jasienska	<i>Alertness as a reliable and practical marker of quality of newborn babies</i>
37	Johnson, Barnacz, Shackelford, Fisher, Keenan	<i>The Role of self-awareness in deception</i>
38	Johnson, Burk, Kirkpatrick	<i>Testosterone and domain-specific self-esteem</i>
39	Josephson	<i>What does the “Polygyny-Threshold Model” predict?</i>
40	Kaveberg, Guise, Salotti, Keenan	<i>Self-manipulations of waist-to-hip ratio using a novel digital paradigm</i>
41	Keenoo	<i>Testing the sexual selection hypothesis of human creativity</i>
42	Kempe, Marshall, Penton-Voak, Hayter, Biersack, Pound	<i>The relationship between digit ratio and prosodic features of child-directed speech in men: does prenatal exposure to testosterone influence later child-directed communication?</i>
43	Khroutski	<i>'Cosmist evolutionary functionalism' - for the universal comprehension of a human behaviour</i>
44	Koenig, Nezlek	<i>Self-presentation strategies as signals of pro-social intent in social relationships</i>
45	Krupp, Saucier	<i>Risk-taking propensity and proposer behavior in the ultimatum game</i>
46	Kurland, Mescher	<i>The consilience of religion and science: an evolutionary perspective, part 2</i>
47	Kwiatkowska-Szleszkowska	<i>Does mother's personality influence the human secondary sex ratio?</i>
48	LaPaglia, Kirkpatrick	<i>Sex differences in the prediction of global self-esteem from domain- specific self-esteems</i>
49	Larsen (NYI)	<i>A mathematical operation of the triune brain model</i>
50	Little, Jones, Perrett	<i>The adaptiveness of human face preference</i>
51	Luxen, Buunk	<i>Fluctuating asymmetry and second-to-fourth digit ratio related to general intelligence and personality</i>
52	Lyons	<i>The role of altruism and punishment in the evolution of cooperation</i>

53	MacKillop, Castelda, Newlin	<i>Testing the SPFit model of addictive behavior: development of the self-perceived fitness questionnaire (SPFQ)</i>
54	Marewski	<i>Towards an evolutionary perspective on self-efficacy</i>
55	Mata	<i>Fast and frugal heuristics: implications for the modularity vs. massive modularity debate</i>
56	McBurney, Zapp, Streeter	<i>Preferred number of sexual partners: tails of distributions and tales of mating systems</i>
57	Mueller, Mazur	<i>Tallness comes with higher mortality in two cohorts of US army officers</i>
58	Nakayama, Takahashi, Radford	<i>Neuroendocrine correlate of "Social Brain"- mediated cognition and emotion in humans</i>
59	Newcomb	<i>The effects of gender atypical behavior on perceived attractiveness in heterosexual and homosexual populations</i>
60	Nytru, Saksvik	<i>Evolutionary organizational psychology (EOP): a new approach to organizational behavior and work Hhealth psychology</i>
61	Oda, Matsumoto-Oda, Kurashima	<i>Like father, like son? Effect of belief in genetic relatedness on resemblance rating</i>
62	Oeckher, Voracek	<i>The relation of 2D:4D and male external genital measurements</i>
63	Ohtsubo	<i>Do japanese 4-year-olds understand others' false belief?</i>
64	Osta	<i>The role of instincts in modern society</i>
65	Panhey	<i>I can't believe it! - How emotions can be used strategically</i>
66	Penton-Voak, Pound, Little, Perrett	<i>Accuracy in personality attributions made on the basis of facial characteristics</i>
67	Perilloux, Webster, Gaulin	<i>The effects of male sociosexuality on associations of female FA and WHR with attractiveness ratings</i>
68	Pivonkova	<i>Men and women differ in their preference of relative body height</i>
69	Platek, Raines, Thomson, Panyavin, Myers, Levin, Sackowicz, Fonteyn, Arigo	<i>Reaction to children's faces: males are more affected by facial resemblance than females</i>
70	Ploeger, van der Maas, Raijmakers	<i>Should we use the adaptationist or the developmental approach in evolutionary psychology?</i>
71	Provost, Quinsey	<i>Evidence for cognitive and emotional mechanisms promoting rape vigilance</i>
72	Putilov	<i>Seasonal depression in evolutionary perspective</i>
73	Rohde, Schmitt	<i>Sexual inequality and its correlates: testing evolutionary hypotheses at the cross-national level</i>
74	Rozmus-Wrzesinska, Pawlowski	<i>Men's ratings of female attractiveness are influenced more by changes in female waist size compared with changes in hip size</i>
75	Sakaguchi, Hasegawa	<i>Predictors of unexpected sexual approaches by strangers: with impression ratings of a natural gait</i>
76	Salotti, Chalet, Kaveberg, Keenan	<i>Male deception detection in terms of physical manipulation</i>
77	Santos, Baptista	<i>Gender differences in partners preferences: evolutionary and developmental considerations</i>

78	Scheyd	<i>Self-assessed mate value and mating preferences: evidence for a facultative calibration</i>
79	Schmitt	<i>Sociosexuality across 48 nations: a cross-cultural study of sex, gender equity, and the reproductive ecology of human mating strategies</i>
80	Schwarz, Hassebrauck	<i>Shifting attitudes toward sexual activities across the menstrual cycle: are women more choosy during the fertile days of their cycle?</i>
81	Sergeant, Dickins, Davies, Griffiths	<i>Aggression, empathy and sexual orientation in males</i>
82	Shoup, Streeter, McBurney	<i>Smelling a partner's clothing during periods of separation: prevalence and function</i>
83	Simmons, Allen	<i>The effects of Zoloft on mood and emotional response in healthy adults</i>
84	Singleton; Cornelissen, Tovee	<i>On what visual areas are human attractiveness judgements based?</i>
85	Smith	<i>Hadza wildlife resource survey</i>
86	Sokol, Thompson	<i>Whines: Bad habit, or part of the human attachment system?</i>
87	Strout, Bush, Laird	<i>Sex (or strategy) differences in jealousy?</i>
88	Strout, Sokol, Thompson, Laird	<i>A preliminary investigation of the relationship between attachment and emotion self-perception</i>
89	Surbey, Voyka, Luc, Corder, Finlayson	<i>Relationships between birth order and personality traits as a function of differential levels of material and socioemotional parental investment</i>
90	Tadinac, Hromatko	<i>Mate preferences in high and low social status groups</i>
91	Takahashi, Tanida, Yamagishi	<i>Sex, attractiveness, and cooperation in social exchange</i>
92	Tamura, Kameda	<i>Are facial expressions contagious in the Japanese?</i>
93	Tsukasaki, Kameda	<i>Robust beauty of the majority rule under uncertainty: an evolutionary computer simulation and a behavioral test</i>
94	van Anders, Watson	<i>Level of relationship status and salivary testosterone in heterosexual men</i>
95	Virtanen	<i>Theory of cultural evolution</i>
96	Vonnahme	<i>Facial perception and mating strategy as a function of digit ratio and mental rotation in human males</i>
97	Windhager, Ruso, Atzwanger	<i>Fishing for consumers' attention</i>
98	Wohlrab, Kappeler	<i>Tattoos and piercings as sexually-selected signals? A pilot study of body ornamentation in Germans</i>

ORAL PRESENTATION ABSTRACTS

LISTED BY CHRONOLOGICAL ORDER & SESSION

Cooperation in Large Groups (Symposium), Chair: Karthik Panchanathan Audimax, Thursday morning

BEYOND KINSHIP AND RECIPROCITY, COOPERATION IN LARGE GROUPS

How can the theory of natural selection explain design features whose proper functions seem to be the delivery of fitness benefits to other organisms? For the most part, Darwin left this question unanswered in his writings. Over one hundred years later, E.O. Wilson claimed that explaining cooperation represents the central problem for students of sociobiology. Judging by the number of publications, altruism continues to be a problem in search of an answer by those interested in the evolution of behavior. While the twin theories of inclusive fitness and reciprocity may account for a good chunk of empirical cases of cooperation between organisms, they seem woefully inadequate for any complete account of human behavior. After all, despite living in large and unrelated groups, human cooperation rivals that of the eusocial insects. This symposium surveys recent research designed to both formally analyze and empirically investigate cooperation in large groups. Combining these approaches allows us to address a variety of important questions. What are the cognitive mechanisms underlying human behavior in the context of n -person social dilemmas? Does a consideration of spatial structure and affect our understanding of the evolution of punishment, altruism and spite? Does incorporating contingent movement rules in spatial environments make cooperation more or less likely to emerge? When reputation effects provide a means of sanctioning defectors through social exclusion, can the free rider problem be solved in a way that makes cooperative systems like collective action more stable? When trade-offs exist between production and risk-monitoring activities, will individuals share in risk-monitoring at equilibrium, or will the burden fall wholly on a few with others free-riding? How do noisy environments affect rates of cooperation? This diverse set of talks represents a small subset of the current research seeking to understand human sociality in the context of large groups.

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10.20 AM

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RECIPROCITY, REINFORCEMENT LEARNING, AND LOCAL ADAPTATION LEARNING AS MODELS OF COOPERATION IN SOCIAL GROUP DILEMMAS

What are the cognitive mechanisms underlying cooperative behavior in groups? We approach this question by examining three cognitive models: a reciprocity heuristic, a reinforcement learning model, and a local adaptation learning model. The models were tested experimentally in a four-person Public Goods Game (PG) and in a Social Dilemma Network game (SDN). The SDN differs from the PG in that it divides the PG into six two-person-PGs, so that each player has the opportunity to play a two-person-PG with the other three players separately. In both games participants repeatedly made decisions about their contribution to the PG. The magnitude of cooperation was higher in the SDN than in the PG, and cooperation increased over time only in the SDN. For both types of games, the reciprocity heuristic and the reinforcement learning model were best in predicting participants' contributions to the public goods. However, participants' information search about their own and the other players' contributions as well as received payoffs in the previous round of the game (recorded with a computerized information board) were most accurately predicted by the reciprocity heuristic, making it the best model to describe cooperation in social dilemma situations. Examining the reciprocity heuristic indicates that individuals use a nice reciprocal strategy.

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10.40 AM

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THE DIFFERENT SOCIETIES RESULT IN THE DIFFERENT WAYS OF EVOLVING ALTRUISTIC PUNISHMENT IN THE SPATIAL STRUCTURED POPULATION

The evolution of altruism is one of the hottest topics in the evolutionary biology, and kin selection, reciprocal altruism, indirect reciprocity, group selection, punishment of selfish individuals have been explaining the condition that altruism evolves.

Here we investigate the condition that altruistic punishment can evolve in the spatial structured population. The lattice model is used as a spatial structured model, where each individual interacts with nearest neighbors. We compare the results caused by two different assumptions in the lattice model: the fertility model (fertility depends on game scores, but individuals die randomly), which many previous studies assume implicitly, and the viability model (mortality depends on game scores, but individuals increase its offspring randomly). Our previous studies showed the fertility and the viability models correspond the cooperation-favored society and the spiteful behavior favored society, respectively.

The results are: (1) A fine of punishment enables altruistic punishment to become an ESS in any model, (2) When the population has no spatial structure, altruistic punishment cannot invade the selfish population in the fertility model, while it can in the viability model when a fine of punishment is very large compared with a benefit from cooperation, (3) Both punishment and spatial structure enable altruism to invade the selfish population in the appropriate values of payoffs. A fine of punishment affects the evolution of altruistic punishment in the viability model, while a benefit from cooperation does in the fertility model.

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11.00 AM

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WHEN THE GOING GETS TOUGH, THE NICE GET GOING: CONTINGENT MOVEMENT AND THE EVOLUTION OF COOPERATION IN GROUPS

Simulations of the evolution of cooperation in groups typically use groups of fixed size. In the simulations described here, group size is endogenous, determined by the movement of agents in and out of groups. It is shown that two different aspects of cooperativeness, the average level of investment and proportion of cooperative individuals, are differently affected by parameters such as the multiplier (for investment in the public good), density, and the total number of agents. Additionally, the dynamics resulting from group formation, growth and dissolution clearly illustrate several phenomena related to multilevel selection. The results of these simulations provide insight into the parameters that could have constrained or promoted the evolution of group-level cooperation in humans.

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11.20 AM

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INDIRECT RECIPROCITY CAN STABILIZE COOPERATION WITHOUT THE SECOND-ORDER FREE RIDER PROBLEM

Human cooperation in large groups takes two forms. In *indirect reciprocities*, individuals help others in order to uphold a reputation and not be excluded from future cooperation. In *collective actions*, individuals

engage in costly behavior that benefits the group as a whole. While the theory of indirect reciprocity seems plausible there is no consensus in explaining the evolution of collective action. Empirical evidence suggests that the punishment of free riders can maintain collective actions, but this only creates a new puzzle: Why engage in costly punishment? Solutions to this “second-order free rider problem” include meta-punishment, mutation, conformism, signaling, and group-selection. Milinski *et al.* report that the threat of exclusion from indirect reciprocity can sustain collective action in the laboratory. Here, we show that indirect reciprocity can stabilize collective actions. As free riders are *indirectly* punished through costless exclusion from ongoing social exchange, there is no second-order free rider problem. However, we also show that such a strategy cannot invade a population in which indirect reciprocity is not linked to collective action. This result thus leaves unanswered how collective action systems arise.

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11.40 AM

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*“TO EAT OR NOT TO BE EATEN?”
DILEMMAS BETWEEN RESOURCE-ACQUISITION AND RISK-MONITORING IN HUMAN GROUPS*

Just as animals have to forage in the wild environment for necessary resources like food, humans have to divide valuable material (such as time and money) and psychological resources (such as attention and motivation) between production activity (“intake”) and risk-monitoring activity. Individuals must find a trade-off between the amount of resources they spend on production activities and the amount of resources they spend on risk-monitoring activities. This paper is concerned with such a trade-off in resource allocation. We examine how individuals monitor common risks collectively by extending a behavioral ecological model of animal foraging to human groups. We predict that game-theoretic aspects of the situation complicate the resource-allocation problem, yielding a producer-scrouter equilibrium (Giraldeau & Caraco, 2000; Kameda & Nakansihi, 2002, 2003) in the group. When the producer-scrouter equilibrium is reached, only a subset of group members engage in the risk-monitoring activity while other group members free-ride, concentrating fully on their own foraging activity. A laboratory experiment implementing a collective foraging situation under risk supported this prediction. “Herd behavior” or “panic” was also observed in the groups. Implications of these findings for human collective risk-monitoring were discussed.

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12.00 AM

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THE EFFECT OF PERCEPTION ERRORS ON THE EMERGENCE OF GENERALIZED EXCHANGE

Although altruism based on direct reciprocity has been studied extensively, the occurrence of altruism without direct reciprocity, called generalized exchange, has been a puzzle. Recently, however, significant advances have been made. First, Nowak and Sigmund (1998a, b) proposed that the “image scoring” strategy makes generalized exchange possible. This strategy decides its behavior based on first-order information (i.e. a recipient’s behavior on the previous round): it gives only to recipients who gave to their recipient. Limitations of their work have led to two further strategies that utilize second-order information (i.e. to whom a recipient behaved) being proposed. One is the “standing” strategy (and variants), which gives to recipients who gave to a recipient or those who did not give to a “bad” recipient (e.g., Panchanathan and Boyd 2003). The other is the “strict discriminator” strategy, which gives only to recipients who gave to a “good” recipient (Mashima and Takahashi 2003). The current study combines mathematical analysis with computer simulation and shows that (1) when there is no error, neither the standing strategy nor the strict discriminator strategy are an ESS (i.e. ALL-C can invade), (2)

implementation errors make it difficult while subjective perception errors make it easy for ALL-C to invade the standing strategy, and (3) given the possibility of errors, the strict discriminator strategy is an ESS in most cases regardless of the error level. Since the increase of ALL-C invites ALL-D's invasion, this result suggests that an adaptive strategy has to have a characteristic that excludes helpers of non-givers.

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Mating Strategies, Chair: Klaus Jaffe
Lecture Hall A, Thursday morning

10.20 AM

Bibiana Paez Minervini, *Francis T. McAndrew
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THE MATING STRATEGIES AND PREFERENCES OF MAIL ORDER BRIDES

Two studies explored the mating strategies and mate preferences of mail order brides from three different countries. In the first study, 48 Colombian mail order brides were compared with 43 single Colombian women who were not mail order brides on a wide variety of attitudinal and demographic characteristics. Both groups also identified qualities that they wished to communicate about themselves to a prospective mate, qualities that they most desired in a mate, and qualities that they believed were most highly sought after by a prospective mate. In the second study, the expressed mate preferences of 60 mail order brides from Colombia, Russia, and the Philippines were compared. With only minor exceptions, there was little cross-cultural variability and both studies confirmed the importance of characteristics such as commitment, ambition, and sexual fidelity that have been identified in previous studies of female mate choice. The results are discussed within a framework of evolutionary explanations for mate preferences in human females.

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10.40 AM

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*THE RELATIONSHIP BETWEEN SEXUAL ORIENTATION AND MATING STRATEGY
IN PERSONAL ADVERTISEMENTS*

Lonely Hearts' advertisements have provided a rich data source for the examination of human mate selection strategies for evolutionary psychologists. In general, studies have shown that heterosexual mating strategies differ as a function of sex, in the very way evolutionary theory would predict (particularly with regard to financial status, physical attractiveness and age). However, only very few researchers have used the same method to study same-sex relationships. Addressing this issue, we performed an analysis of 717, content-coded, heterosexual and homosexual advertisements from "Time Out London" magazine. Assuming homosexual mate choice is governed by the same underlying psychology, it might be predicted that advert content will not differ as a function of sexual orientation (this forms our Null Hypothesis). However, the results show that, while this is true for some aspects of advert content, several other aspects differ between homosexuals and heterosexuals of the same sex. The socioeconomic/cultural relationship between members of the opposite sex is obviously not the same as it is between members of the same sex. For instance, two randomly selected members of the same sex are more likely to be of similar wealth than two randomly selected members of the opposite sex. Therefore, we suggest that the pattern of results may be best understood as reflecting the adaptive contingency of human mating

strategies. As sex-typical mate preferences may be best achieved by different means depending on this socioeconomic/cultural relationship between advertiser sex and target sex.

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11.00 AM

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*GENDER-SPECIFIC CHANGES OF SEXUAL MOTIVATION WITH THE DURATION OF PARTNERSHIP
IN YOUNGER AND OLDER COUPLES*

Changes of sexual motivation in relation to the duration of partnership are investigated in three samples aged 30, 45 and 60. In the samples of 30 and 45 male motivation stays at the same level regardless of how long the partnership had been lasting at the time of the interview; female sexual motivation matches male motivation up to about two years after the beginning of the partnership and then steadily drops to lower levels. In the sample aged 60 sexual motivations of males is dropping in the same way as female motivation does, but always stays above the female's curve. These results can be reproduced with different measures of sexual motivations, they also fit well with earlier findings from a study of students aged 20 – 30. Interpretations from social constructivism or from mainstream psychology for this pattern of changes depending on gender and time are hard to conceive. The results seem more intelligible from the perspective of evolutionary psychology as expressing evolved designs for sexual motivation, fine tuned to the specific life situations of males and females. Male motivation is hypothesized as having been shaped by the benefits of effective mate guarding, and female motivation by the reproductive advantage of establishing a pair bond. In addition subtle mechanisms may have been involved like the signalling function of having sex with a constant partner over a longer time period and the adaptation of the female immune system to the alien protein coming from the male.

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11.20 AM

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FEMALE SOCIOSEXUALITY AND PREFERENCE FOR MALE MASCULINIZATION

We investigated preference for male masculinization as a function of female sociosexuality. Because sociosexual orientation reflects individual differences in openness to short term mating, women with less restricted sociosexuality (as measured by the Sociosexuality Orientation Index) may have similar preferences to fertile women, such as a greater attraction to highly masculinized faces and bodies. In study one, 40 female university students rated the attractiveness of pictures of male faces and somatotypes differing in masculinization level. All women preferred the average faces and the mesomorph somatotype. However, women with less restricted sociosexuality found the faces of men more attractive in general and showed relatively greater preference for masculinized bodies than did women with more restricted sociosexuality. In study two, 56 women met with two differentially masculinized male confederates (who had been rated by independent observers as equally attractive) in a "speed dating" scenario. After each date, women indicated their interest in each man for short term and long term relationships via questionnaire. In this more naturalistic context, sociosexuality was related to an increased interest for the more highly masculinized man in short term dating scenarios. Thus, female sociosexuality appears to be related to preferences for higher levels of male masculinization.

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11.40 AM

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*THE EFFECTS OF INCREASING CONTROL OF RESOURCES ON FEMALE REPRODUCTIVE
STRATEGY AND PARTNER PREFERENCES*

Constraints on reproductive success influence tradeoffs made by individuals and affect the reproductive strategies employed. In humans, female reproductive success is typically constrained by the ability to secure a partner able to invest the resources necessary for offspring survival. Increasing female control of resources inherent in increasing sexual equality may then be expected to influence strategies and mate preferences as tradeoffs shift conditionally. This study investigated a number of hypotheses in relation to the effect of female "empowerment" on mate choice and reproductive strategy. Online questionnaires and face preference tests were used to obtain putative measures of female empowerment (e.g. financial independence, level of education and perceptions of control), reproductive strategy (e.g. number and birth spacing of offspring) and mate preferences (e.g. self reported preferences and preference for faces manipulated for masculinity, age, symmetry and health) from a wide range of subjects within the UK - a society with increasing but highly variable levels of female "empowerment". Preliminary results demonstrate the differing effects of factors associated with socio-economic status and those associated with "empowerment" on partner preferences (such as ideal age of partner and preferences for age in faces). These findings are discussed in relation to previous research and theory.

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12.00 PM

Klaus Jaffe
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ON THE ADAPTIVE VALUE OF NARCISSISM

Theoretical studies suggest that mating and pair formation is not likely to be random among sexual organisms with complex genomes and that sex among genetically complex organisms requires mate choice strategies for its evolutionary maintenance, as it reduces excessive genetic variance produced by out-crossing. One strategy achieving this aim efficiently is assortative mating defined as "self seeking like". Assortative mating increases the probability of finding a genetically compatible mate, without fomenting inbreeding, and without hindering the working of other mate selection strategies which aim to maximize the search for "good genes", optimizing the working of sex in evolutionary terms.

At least two set of evidences for this narcissist mechanism exists:

In a significant proportion of human reproductive couples, the partners show much higher facial resemblances than can be expected by random pair formation, or as the outcome of "matching for attractiveness" or the outcome of competition for the most attractive partner accessible, as had been previously assumed.

"Self seeking like" is also at work when humans chose a pet, as in a significant proportion of human-pet pairs, the partners show much higher facial resemblances than can be expected by random pair formation.

The data supports the hypothesis that among humans, narcissism is an inborn drive, which optimizes mate selection strategies. This drive serves as a basis for aesthetic criteria, applied in many biological, social and cultural contexts, which emerged probably several times during evolution.

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Parental Investment, Chair: Sarah Johns
Lecture Hall B, Thursday morning

10.20 AM

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SOME PHYSIOLOGICAL AND PSYCHOLOGICAL CORRELATES OF PARENTAL INVESTMENT

Contemporary theories and research on animal behavior indicate that parents show discrimination in their parental investment .

Parents are expected to adjust their parental expenditure according to the benefits for their offspring and the costs to themselves in order to maximize their fitness. The Darwinian theory predicts that parental psychology evolved so as to discriminate between children for the allocation of parental care. It is possible that, as shown by some recent studies, children raised by stepparents will not benefit from a parental investment as significant as the children raised by their genetic parents.

In order to highlight these points, we studied the short-term and long-term effects of the decrease of parental investment on two populations: French University students (1300 individuals) and adults from the GAZEL cohort, aged 55 to 65 (1000 individuals).

Physiological and psychosocial characteristics of children raised by their genetic parents vs. in a recomposed family were evaluated using questionnaires. The main axis of the investigation are social and sexual behavior, growth, stress (estimated by the cortisol concentration in saliva), etc.

The results will be discussed within the framework of the current theories on evolution of parental investment in humans.

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10.40 AM

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THE OPTIMAL ALLOCATION OF PARENTAL INVESTMENT BASED ON OFFSPRING AGE

Darwinian evolution suggests that natural selection has led parents to distribute limited resources among their offspring in ways that maximize parental fitness. Parents may adjust their expenditure among their offspring, who may differ on factors such as sex, size or age. Making predictions about the effect of offspring age alone, however, is problematic because offspring's aging may have mutually conflicting effects: older offspring might be favored due to their increased reproductive value, and yet younger offspring also be favored due to the greater impacts of parental expenditure on the fitness of offspring. I develop a kin selection, ESS model to seek the optimal allocation of parental investment among offspring of differing ages, using a state-dependent life history approach based on reproductive value. At evolutionary equilibrium, the marginal changes in relative genetic success ('market share') would be equal for investment in older and younger offspring, just like the case of sex allocation. The model predicts that the maximization of market share should result in biased investment toward older offspring. The model will shed new light on the evolutionary logic of parental favoritism in humans.

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11.00 AM

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*SPOUSAL AGE DIFFERENCES AND SEX DIFFERENCES IN LIFE EXPECTANCY ARE
CONFOUNDERS OF MATRILATERAL BIASES IN KIN INVESTMENT*

Matrilateral biases in human kin investment are predicted by evolutionary-based theories, such as parental investment theory (Trivers, 1972) and paternity confidence theory (Daly, Wilson, & Weghorst, 1982). These biases have been successfully tested by recent empirical research. For example, emotional closeness to matrilateral relatives is significantly higher than to patrilateral relatives (Russell & Wells, 1987), and this finding has subsequently been extended to discriminative solicitude in grandparent-grandchild (Euler & Weitzel, 1996) and aunts/uncles-nieces/nephews relationships (Gaulin, McBurney, & Brakeman-Wartell, 1997). However, moderator variables such as birth order or residential distance have only rarely been accounted for by researchers, and generalizability across cultures has not been extensively tested (but see Salmon & Daly, 1998; Pashos, 2000). We predicted that two possible confounders, spousal age differences and sex differences in life expectancy, may create noticeable differences in exposure time of older relatives to younger relatives, which could govern the previously observed matrilateral effects. Therefore, we investigated matrilateral biases in kin investment, discriminative solicitude, and emotional closeness in parent-child, grandparent-grandchild, and aunt/uncle-niece/nephew dyads in three studies (Ns = 976, 321, and 200) of Austrian adults, thereby accounting for differences in relatives' exposure time. Although previous findings were largely replicated in these three data sets, matrilateral effects were not obtained when the confounding effect of relatives' differential exposure time was statistically removed.

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11.20 AM

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*SUBJECTIVE LIFE EXPECTANCY AND OFFSPRING SEX: SUPPORT FOR THE TRIVERS-WILLARD
HYPOTHESIS*

The Trivers-Willard hypothesis predicts that when women are in poor physical condition, or reside in deprived environments, they are more likely to give birth to daughters than to sons. Under deprived environmental conditions, or when in poor physical health, it has been hypothesized that parents should take into account the available resources and manipulate the sex of any children born. Using subjective life expectancy (SLE) as a measure of how a woman views her future health and environment, I demonstrate that there is an association between the sex of the first child and SLE in a sample of mothers from a contemporary, British population. Women who believed they had longer to live were more likely to have had a male birth than women who thought they would die earlier. Detection of such a bias among the children of British mothers may provide evidence that the sex ratio under relatively affluent, Western conditions can still be influenced by adverse environmental or poor maternal condition. The results also suggest that a woman's subjective life expectancy may be the observable product of an evolved, sub-conscious psychological mechanism that integrates environmental and physical conditions of the mother to determine her mortality risk, and so produce appropriate biases in both behavioural and physiological responses.

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11.40 AM

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A NON-LINEAR APPROACH TO THE TRIVERS-WILLARD HYPOTHESIS: EVIDENCE FROM AN ARCHIVAL ANALYSIS OF INHERITANCE DATA

The Trivers-Willard (TW; 1973) hypothesis predicts that wealthier parents will share more of their resources with their sons relative to their daughters, whereas the opposite pattern will be true among poorer parents. The ability of the TW hypothesis to predict differential parental investment in modern humans has met with mixed results: Archival analyses of wills have both supported the TW hypothesis (Smith, Kish, & Crawford, 1987) and refuted it (Judge & Hrdy, 1992). Likewise, analyses of parental investment variables such as interbirth intervals and breast-feeding durations have produced results both in favor of the TW hypothesis (Gaulin & Robbins, 1991) and against it (Keller, Nesse, & Hofferth, 2001). These mixed results suggest that the TW effect is either small (and therefore difficult to detect), or that its strength is moderated by other variables, such as relative wealth. Given that the TW effect would likely have been stronger in the environment of evolutionary adaptedness (EEA) when parents' resources were relatively scarce, it should stand to reason that the TW effect in modern Western societies should be stronger among poorer families. Multilevel modeling of a sample of more than 160 archived British Columbian wills revealed the predicted moderation of the TW effect by wealth. Specifically, the TW effect was strongest among poorer parents, virtually non-existent among parents of moderate wealth, and in the inverse direction among wealthier parents. The efficacy of this non-linear model to explain the mixed literature on the strength of the TW effect in modern humans is discussed.

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12.00 PM

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PATERNAL CERTAINTY, DESCENT, POST-MARITAL RESIDENCE, AND LEVEL OF BIRTH-RELATED INVESTMENT

A measure for "paternal certainty" was developed for the HRAF Probability Sample, a random cross-cultural sample consisting of sixty of the world's cultures. In addition, we calculated the level of birth-related investment made by a newborn's biologically "certain" and "uncertain" kin. Biologically "uncertain" kin were divided into four groups: 1) the newborn's father, 2) the father's matrilineal kin 3) the father's patrilineal kin, and 4) the mother's patrilineal kin. Paternal certainty was found to be positively correlated with the amount of birth-related investments made by uncertain kin. Birth-related investments were also shaped by a society's rules of descent and post-marital residence. These findings are consistent with inclusive fitness theory and the theory of reciprocal altruism.

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Individual Differences in Life-History Strategies (Symposium),

Chair: Aurelio José Figueredo, Lecture Hall C, Thursday morning

INDIVIDUAL DIFFERENCES IN LIFE HISTORY STRATEGY

Life History Theory describes an individual's total bioenergetic and material resources as being allocated between Somatic Effort, which are the resources devoted to the continued survival of the individual organism, and Reproductive Effort, which are the resources devoted to the production of new organisms as vehicles for the survival of the individual's genes. Reproductive Effort is further subdivided into Mating Effort, which are the resources devoted to obtaining and retaining sexual partners, and Parental Effort, which are the resources devoted to enhancing the survival of any offspring produced. A K-selected Life History Strategy is one which allocates resources preferentially to Somatic Effort over Reproductive Effort, and to Parental Effort over Mating Effort, thus emphasizing the survival of individual organisms (whether self or offspring) over the production of new ones. The implication of this pattern is that K-selected individuals should therefore manifest the benefits of these allocations in terms of the greater phenotypic (as opposed to genotypic) fitness of organisms. K-selected organisms should thus be more individually viable on a variety of indicators of general health, developmental stability, and mental and physical function. This symposium presents several converging lines of evidence that K-selected individuals do indeed show evidence of this pattern of resource allocation by examining different sources of data for the expected results of greater Somatic and Parental Effort, including differential allocation of Parental Effort by sex. Alternative hypotheses, such as Fitness Indicator Theory and Genomic Imprinting, are considered, with suggestions for the reconciliation of these potentially complementary theoretical perspectives.

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10.20 AM

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A TEST OF R-K LIFE HISTORY THEORY ACROSS 234 MAMMALIAN SPECIES

One powerful way to demonstrate the validity of r-K theory is to simultaneously examine characteristics hypothesized to vary together across a large number of diverse species. If the different traits fall along a straight line it supports the concept. We examined 234 different mammalian species derived from Eisenberg's massive compilation of animal data in *The Mammalian Radiations* (1981), extended by the use of an Internet Search of both field and zoo samples. The animals selected vary physically and behaviorally. The low end of the size continuum included the Madagascar Hedgehog (body length = 185 mm; body mass = 225 grams; brain mass = 2 grams; and longevity = 11 years). At the high end was the African Elephant (body length = 5,000 mm; body mass = 2,766,000 grams; brain mass = 4,480 grams; and longevity = 80 years). We found that all the variables were part of a single r-K general factor. The loadings with the factor were: longevity (0.91), brain weight (0.85), gestation time (0.86), birth weight (0.62), litter size (-0.54), age at first mating (0.73), duration of lactation (0.67), body weight (0.61) and body length (0.63). Controlling for body weight and body length did not change the overall picture.

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*THE K-FACTOR, COVITALITY, AND PERSONALITY: A PSYCHOMETRIC TEST
OF LIFE HISTORY THEORY*

A psychometric test of life history theory as applied to human individual differences was performed using the MIDUS survey. The MIDUS survey consisted of a telephone interview and two follow-up mail surveys given to a nationally representative sample over a one year period in 1995. The survey was limited to English speakers in the United States between the ages of 25 and 74. Twenty scales were constructed using items from the MIDUS survey hypothesized to measure cognitive and behavioral dimensions theoretically related to life history strategy. These scales were used to construct a single common factor, the K-Factor, which accounted for 66% of the variance. The scales used included Mother Relationship Quality, Father Relationship Quality, Marital Relationship Quality, Children Relationship Quality, Family Support, Altruism Towards Kin, Friends Support, Altruism Towards Non-Kin, Close Relationship Quality, Communitarian Beliefs, Religiosity, Financial Status, Health Control, Agency, Advice Seeking, Foresight/Anticipation, Insight Into Past, Primary Control/Persistence, Flexible/Positive Reappraisal, and Self-Directedness/Planning. Another common factor, Covitality, was constructed from scales for Subjective Well-Being, Negative Affect, Positive Affect, General Health, and Medical Symptoms. Finally, a single general factor, Personality, was constructed from scales for Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. The K-Factor, Covitality factor, and general Personality factor were found to be significantly correlated with each other, supporting the hypothesis that high K predicted high somatic effort and was also manifested in behavioral display. Thus, a single higher-order common factor, the Super-K Factor, was constructed that included the K-Factor (.79), Covitality factor (.55), and Personality factor (.72).

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SEX-BIASED PARENTAL INVESTMENT IN A CROSS-CULTURAL SAMPLE OF 35 COUNTRIES

This study examines condition-dependent sex allocation and differential parental investment in humans by applying the Trivers-Willard hypothesis. Within a polygynous social mating structure where reproductive variance is higher for males than for females, mothers in optimal condition (defined by high status, good health, and abundant resources) are more likely to produce and invest in male offspring whereas mothers in adverse condition (defined by low status, poor health, and resource deprivation) are more likely to produce and invest in female offspring to enhance potential reproductive success. Previous research on humans tends to be restricted to one cultural group and thereby limited in sample size. For this study, nationally representative household survey data collected by the Demographic and Health Surveys (DHS+) program across 35 countries was used to test biological, resource-oriented, and behavioral aspects affecting maternal condition, sex allocation, and parental investment in humans. Country samples ranged from 732 to 21,839 women (ages 12 - 49, with one or more children living with them) interviewed within South Asia, Sub-Saharan Africa, the Caribbean/Latin America, and the Near East/North Africa. The units of analysis for this study were the mothers and their last-born child (N = 128,039 woman-child pairs). A sequence of hierarchical regressions theoretically pre-specified a causal model concerning four constructed scales measuring maternal biological condition, socioeconomic resources, and prenatal care and health-seeking for the last-born child. The overall model indicated stable, cross-regional, and country-specific main effects indicating that resource-related factors and maternal biology predict daughters whereas protective/preventive health-related behaviors predict sons.

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*DOES LIFE HISTORY STRATEGY ACCOUNT FOR PHENOTYPIC VARIATION
IN HUMAN MENTAL AND PHYSICAL TRAITS?*

There are many competing theories used to explain the relationships among fluctuating asymmetry (FA), sexual attractiveness, general intelligence (g), physical health, and psychopathology. One such account, proposed by Rushton (2000), is that these traits are directly related to individual differences in life-history strategy, as explained by r/K theory. This perspective proposes that individuals whose ancestors evolved in a stable environment in which their genotype is selected to anticipate a long life expectancy would increase their fitness by investing more metabolic energy in producing high quality immune and cognitive systems at a tradeoff to delayed sexual maturation and lower lifetime reproduction. Another account proposed by Miller (2000) suggests that these phenotypic expressions are each small components of an overarching factor that indirectly displays some portion of an individual's endogenous genetic quality through fitness signaling. In the tradition of strong inference and stemming from recent research that established the validity of measuring life history strategy via self-report measures (Figueredo et al., 2003), the current study is a first step in testing these competing hypotheses on a sample of undergraduate college students from Sierra Vista, Arizona.

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11.40 AM

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*FITNESS INDICATOR THEORY PREDICTS GENETIC CORRELATION PATTERNS AMONG
INTELLIGENCE AND PERSONALITY TRAITS IN 2,144 PAIRS OF BRITISH 7-YEAR-OLD TWINS*

Some human mental traits such as intelligence and kindness may have evolved as good genes indicators through mate choice. If so, such traits should show positive genetic correlations, especially in males and in individuals of lower genetic quality (as predicted by my fitness indicator theory combined with David Houle's pleiotropic mutation theory). This talk presents a multivariate genetic analysis of 2,144 British twin pairs from Robert Plomin's TEDS (Twins Early Development Study) dataset. Maximum likelihood factor analysis of 5 cognitive test scores, 63 parent-rated behavior items, and 58 teacher-rated behavior items yielded one general intelligence factor and four personality factors: confidence, gentleness, calmness, and kindness. In both sexes, all 5 traits showed substantial heritabilities, small positive phenotypic correlations, and similar rank-orderings of genetic correlations. Yet the genetic correlations were typically more positive in boys than in girls (average +.28 vs. -.04 across 10 correlations). For example, boys showed all-positive genetic correlations between intelligence and three personality traits (confidence, kindness, and gentleness), whereas girls showed all-negative genetic correlations between intelligence and these same personality traits. When male twin pairs are split at the mid-point of a phenotypic quality index, the low quality group shows higher trait heritabilities and genetic correlations than the high quality group, as predicted by pleiotropic mutation theory. No such effect was found for females. These results suggest that even before puberty, the genetic architecture of human mental traits is sexually differentiated, with male mental traits revealing general genetic quality much more reliably than female mental traits.

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12.00 PM

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SELFISH GENES AND SELFISH KIDS: DOES DIFFERENTIAL GENOMIC IMPRINTING MEDIATE THE RELATIONSHIP BETWEEN FATHER ABSENCE AND CHILDREN'S ANTISOCIALITY TOWARD MATERNAL KIN?

The evolution of genomic imprinting as envisioned by David Haig is a history of parent-offspring conflict, in which paternal genes influence fetal and placental tissue to greedily exploit maternal resources. A relationship between brevity of parental relationship prior to conception and pregnancy-induced hypertension suggests that fathers might even adjust the process of genomic imprinting during sperm production to produce offspring that more ferociously exploit mothers to which the father was not pair-bonded. If so, the children of short-term matings should also be more likely to exhibit any behavior that gives them a paternal genomic fitness advantage, disregarding any negative effects the behavior has on maternal kin. This extension of genomic imprinting theory may explain some childhood antisocial behaviors, including some symptoms of conduct disorder and oppositional defiant disorder, and some items in the Youth Version of the Hare Psychopathy Checklist. These behaviors, such as stealing from parents and violating parental rules, impose high inclusive fitness costs, so are harder to explain through models of sociopathy as a frequency-dependent cheater strategy (e.g. Mealey, 1995). This genomic imprinting model explains several puzzling findings concerning conduct disorder, psychopathy, and father absence, including the fact that father absence predicts parent-rated conduct disorder better than teacher-rated conduct disorder, and the fact that childhood psychopathy is associated with a greater loss in subjective "closeness" to parents than to unrelated peers. Genomic imprinting effects may be an important neglected factor in the etiology of superficially maladaptive childhood psychopathologies, and in life history strategies generally.

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2D:4D Digit Ratio and Sex-Dependent Behaviors (Symposium),

Chair: John T. Manning

Lecture Hall D, Thursday morning

*SECOND TO FOURTH DIGIT RATIO (2D:4D), PRENATAL SEX HORMONES,
AND SEX DEPENDENT BEHAVIOURS*

It has been suggested that the ratio of the length of the 2nd and 4th fingers (2D:4D digit ratio) is negatively related to prenatal testosterone and positively related to prenatal oestrogen. In support of this there have been recent reports of associations between 2D:4D and sexually dependent traits such as the expression of the androgen receptor gene, fertility, sexual orientation, developmental disorders (autism and Aspergers), hand preference, and schizophrenia. However, there is still much to be learnt regarding 2D:4D. This symposium will include 2D:4D reports that will be interpreted within the framework of the consequences of prenatal sex hormones, and in particular we will cover aspects of mate choice, fecundity, developmental patterns, eating pathologies and schizophrenia related behaviours. Specifically the studies are concerned with (i) partner choice and the population genetics of 2D:4D (i.e. assortative mating and heritability) (ii) the relationship between 2D:4D and family size and the sex ratio of offspring (iii) the inter-relationships between 2D:4D and developmental instability with particular reference to facial asymmetry (iv) 2D:4D as a correlate of complex sex dependent behaviours (i.e. eating disorders) and (v) the relationship between 2D:4D and schizotypal traits which are associated with reduced family size but may be important in their relationship to the origins of humans.

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2D:4D, ASSORTATIVE MATING, AND HERITABILITY: EVIDENCE FROM AUSTRIAN FAMILY DATA

Evidence for assortative mating on and heritability of human behavioral and physical traits is the rule rather than the exception. Here we demonstrate these effects for the second to fourth digit ratio (2D:4D), a sexually dimorphic physical trait which most likely is a marker variable for prenatal sex hormonal conditions (Manning, 2002). Preliminary studies on 2D:4D heritability, across diverse samples, yielded estimates in the range of .40-.70 (Manning et al., 2001; Manning, 2002, pp. 12-13; Marshall, 2000; Ramesh & Murty, 1977). However, up to now evidence for assortative mating on 2D:4D was only found in one study (Manning, 2002, p. 50) whereas it was absent in two further studies (Marshall, 2000; Ramesh & Murty, 1977). The present contribution addressed the above research questions with a large family-based data set (1260 Austrian subjects from 235 families, including 239 couples). Results indicate that 2D:4D was significantly heritable in this sample ($h^2 > .60$) and that there also was significant assortative mating ($r > .20$). This heritability estimate is considerably higher than those for personality and temperament dimensions and nearly as high as for intelligence, whereas the spousal correlation is commensurate with those for personality dimensions, physical traits, and values, but lower than those for physical attractiveness or intelligence (Lykken & Tellegen, 1993; Thiessen, 1999). The implications of these findings for the evolutionary research program on 2D:4D are discussed (among others, the inflation of heritability estimates and the expansion in phenotypic offspring variance through assortative mating).

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THE RELATION OF 2D:4D WITH FAMILY SIZE AND OFFSPRING/SIBSHIP SEX RATIO: NEW DATA FROM MODERN AND 19TH CENTURY POPULATION SAMPLES AND META-ANALYSIS OF THE LITERATURE

2D:4D (second to fourth digit ratio) has been shown to be correlated to a suite of sex-dependent variables, including fertility-related measures (Manning, 2002). Specifically, the predicted negative relation of parental 2D:4D and offspring sex ratio (James, 2001) has been found in European and Caribbean samples (Manning et al., 2002), and sex-specific relations (negative for males, positive for females) of 2D:4D and family size have been documented in European, Caribbean, African, and South Asian samples (Manning et al., 2000, 2003). Here we report data on the following (mostly based on an Austrian family study with over 1200 participants): (a) across sexes and generations, 2D:4D is weakly negatively related to offspring sex ratio, thereby replicating and extending previous findings. (b) 2D:4D is also weakly negatively related to the sibship sex ratio, which finding is new. (c) Across generations, there are sex-specific relations of 2D:4D and family size. (d) Spousal 2D:4D differences (female-minus-male) are positively related to family size as well as to spousal age differences (male-minus-female). (e) Analyses of 19th century anthropometric data (Baltic populations) reveal stronger 2D:4D/family size relations than for contemporary samples and stronger relations for number of surviving than for total number of children. (f) A meta-analysis of existing evidence on 2D:4D relations with offspring sex ratio and family size suggests that cumulatively there is evidence for 2D:4D effects on reproductive outcome and success, though predicted relations are not found in every sample because of the smallness of these effects.

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SECOND TO FOURTH DIGIT RATIO AND FACIAL ASYMMETRY

Bilateral symmetry of physical traits is hypothesized to reflect overall quality of development, especially the ability to resist environmental perturbations during development. A symmetrical face may signal developmental homeostasis as symmetry of bilateral traits is positively correlated with genetic heterozygosity and may provide genetic diversity in defense against parasites. Numerous studies have demonstrated that attractiveness assessments are also sensitive to facial symmetry suggesting that preferences for symmetric faces may thus have some adaptive value. The current study attempts to clarify the role of early hormone levels for the development of facial asymmetries. Recent evidence suggests that the relative length of the 2nd to 4th finger (2D:4D) is a pointer to prenatal testosterone levels and may thus serve as a window to the prenatal hormonal environment. We measured 2D:4D in a sample of male and female college students and analysed their faces for horizontal asymmetries. Our results show that 2D:4D was significantly negatively related to facial asymmetry in males whereas in females facial asymmetry was significantly positively related to 2D:4D. The findings indicate that (1) facial features of adults are associated with in utero levels of sex steroids, and (2) high titers of prenatal sex hormones are likely to cause developmental instability. We suggest that digit ratio may thus be considered as a pointer to an individual's developmental instability and stress through its association with prenatal sexual steroids.

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SECOND TO FOURTH DIGIT RATIO AND EATING DISORDERS IN WOMEN

Eating disorders are more common in females than males, and this may be partly explained by hormonally-influenced regulators of appetite such as leptin. Testosterone reduces leptin levels, and leptin is high in female fetuses when brain organisational effects are likely to be important. Here we investigate the relationship between a negative proxy for prenatal testosterone, the ratio of the 2nd and 4th digit length (2D:4D), and measures of eating disorders in women. We measured 2D:4D from the right and left hand, together with waist-to-hip ratio and BMI in 122 female undergraduates. Participants completed the Stirling Eating Disorder Scales (SEDS), the Eating Disorder Inventory-2 (EDI-2), and a questionnaire concerning body perception. We found right 2D:4D correlated positively with (i) Anorexic dietary cognition, Anorexic dietary behaviour, Perceived external control, Low assertiveness, Low self-esteem and Overall measure of pathology in the SEDS, and this was independent of BMI (ii) Drive for thinness, Bulimia, Body dissatisfaction and Ineffectiveness in the EDI-2, but this was not independent of BMI (iii) Actual body perception, and the Difference between Actual and Ideal body perception, with the latter independent of BMI. We suggest that low prenatal testosterone, as indicated by high 2D:4D, may allow fetal levels of leptin to rise, and this may affect brain organisation leading to an increase in the probability of adolescent-onset female eating disorders and body dissatisfaction.

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*SECOND TO FOURTH DIGIT RATIO, PRENATAL OESTROGEN, THYROID FUNCTION AND
SCHIZOTYPAL TRAITS*

Schizotypy (psychosis-proneness) and its extreme expression schizophrenia are universally common in the human species and are probably influenced by genes. This represents an evolutionary problem because schizophrenia reduces reproductive success and should have much lower frequencies. There is evidence that schizophrenia is related to fetal nutrition including iodine deficiency, and its aetiology is also related to sex hormones. Here we show that a correlate for prenatal oestrogen, the second to fourth digit ratio, is positively related to (i) thyroid dysfunction in children and (ii) positive schizotypal symptoms such as cognitive disorganisation in adults. Oestrogen increases levels of serum thyroxine-binding globulin, this places stress on the thyroid gland to produce more thyroxine, and this process is iodine dependent. We suggest that fetuses who have high prenatal oestrogen are prone to subsequent hypothyroidism, schizotypy and schizophrenia. Selection pressure for a reduction in the rate of schizophrenia may be ineffectual because female fertility and many sex dependent traits are influenced by in utero oestrogen.

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Health, Chair: Iver Mysterud
Lecture Hall A, Thursday afternoon

1.30 PM

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EVOLUTION, REFINED SUGAR AND PROBLEMS IN A NEW ENVIRONMENT

Plants increase their probability of survival by spreading seeds. Ripe fruits and berries with a sweet taste attract plant eaters which help them in this endeavor. In the past, humans were guided by a proximate mechanism for sweetness towards plants with a valuable nutrient content (i.e. energy substrates, vitamins, minerals, antioxidants). This increased their survival in times where hunting was unsuccessful. The sweetness of plants and mankind's sweetness response was mutually beneficial. However, in an environment gradually characterized by an ever more rapid cultural evolution, the initial sweetness response became maladaptive. The emergence of a universally available, refined (white) sugar resource eventually created new health problems. Refined sugar destroys teeth, drains the body of several vitamins and minerals, upsets the hormonal balance of the body, and in doing so contributes to obesity, diabetes type 2 and a number of other diseases and problems. Sugar can impair the immune system and contributes to viral as well as bacterial infections and cancer, and promote behavioral, cognitive and mental problems. Since the eating of refined sugar is a novel phenomenon in evolutionary perspective, we are not adapted to it, and many individuals pay a high penalty for being indulged. Therefore, many of us are well advised to reduce the sugar intake as much as possible.

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WE STILL "EVOLVE": HYPEROSTOSIS FRONTALIS INTERNA AS A MODEL FOR LIFE-STYLE/HORMONAL-BASED MICROEVOLUTIONARY ALTERATION IN HUMAN ANATOMY AND PATHOLOGIC CONDITIONS?

Human evolution is still ongoing. Various influences like variation of selective pressures, exchange of genes, environment (e. g. climate) or change of socio-economical structures (hunter-gathering societies versus settled communities) have an impact on human anatomy and behaviour. Particularly, modern lifestyle with its unique aspects of e.g., work load or sports activities does it too. The medical significance of such alterations is usually underestimated.

Microevolutionary or secular changes - occurring in short time periods - have been shown for various anatomical or pathological human characteristics: increase of incidence of the median artery of the forearm (Henneberg and George 1995), prevalence of spina bifida occulta (Henneberg and Henneberg 1999), osseous intervertebral foramen width dimensions (Rühli and Henneberg 2004), prevalence and sex ratio of hyperostosis frontalis interna cases (Hershkovitz et al. 1999).

Hyperostosis frontalis interna (Morgagni 1719) - HFI - is a restricted bilateral thickening of the frontal endocranial surface, which is frequently found in postmenopausal females today. Its pathologic value is still debated. Surprisingly, this condition has a relatively higher male prevalence in the rarely reported archaeological cases. Possible suggestions of the causative factors for this prevalence and sex ratio trends include industrialization-related life-style alterations especially in females (Hershkovitz et al. 1999), or hormone-based explanations (Rühli and Henneberg 2002; Rühli et al. in press). The issues of HFI will be used as a model to discuss in a wider approach the extent and impact of the ongoing evolution of human anatomy and pathological conditions.

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2.10 PM

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DOES IMPROVED WATER SUPPLY AFFECT CHILDHOOD MORTALITY?: A LIFE HISTORY APPROACH TO INVESTIGATING DEMOGRAPHIC CHANGE IN SOUTHERN ETHIOPIA

Across the developing world water development technologies are designed to reduce women's workloads by making water available at reasonable distances. Development experts and demographers have indicated that improving access to clean water may also reduce levels of child morbidity and mortality. However, evolutionary life-history theory predicts that a reduction in women's energetic expenditure may lead to higher reproductive function. Shortened birth interval lengths are likely to increase levels of childhood mortality, by removing the nutritional and immunological effects of prolonged lactation and increasing sib competition. This study investigates all the demographic consequences following the installation of water taps stands in a rural agro-pastoralist community in Southern Ethiopia.

Using life tables and multivariate hazard modelling techniques, correlates of both early childhood mortality and fertility are identified. Co-variables including maternal age, birth order, socio-economic status, and birth interval length are entered into the models. The analyses indicate that there is no effect of improved access to the water on a child's probability of dying under 5. However, access to the new water supply is associated with a higher monthly risk of birth.

In southern Ethiopia the installation of village tap-stands has not led to the improvements in child health and survivorship anticipated by development workers. However, there is evidence to suggest that any benefits of clean water may be obscured by the negative effects of shorter-birth spacing. The findings support the evolutionary life history assumption that human reproductive systems are designed to maximize reproductive fitness not health and longevity.

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RISKY SEXUAL BEHAVIOR AS AN ADAPTIVE RESPONSE TO HIV/AIDS

Since 1990 over 20 billion dollars have been poured into global initiatives for the treatment and prevention of HIV/AIDS. Current global HIV prevention initiatives emphasize safe sex practices but results show mixed success. Using global data generated by the United Nations, we show, with a simple evolutionary model, that when life expectancy is low and infant mortality rates are high, risky sexual behavior is a rational adaptive response to avoid reproductive failure. Our results indicate that initiatives, which improve overall health, reduce childhood mortality, and increase life expectancy of the at-risk populations, may provide effective means to combat the spread of HIV/AIDS.

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HEALTH AT BIRTH, FAMILY STRUCTURE AND TEMPERAMENT

Temperamental traits moderate children's interactions with parents, siblings and friends. These traits may reflect the early influence of children's social environment as well as their health status at the early stages of development. In light of Trivers' parental investment theory these traits may also represent strategies employed by children to acquire resources essential for their survival and development.

We investigated the relationship between children's family structure (birth order, number of siblings), their physical characteristics at birth (weight, length and apgar) and their temperament. Sixty-nine children aged 2 to 14 (mean age 9.2 years) from Słopnice village in Southern Poland were rated by their mothers on EAS-Temperament Survey for Children (Buss&Plomin, 1984), which consists of emotionality, activity, sociability and shyness subscales. Data regarding family structure and physical characteristics at birth were gathered with a standardized questionnaire.

We found a negative correlation ($r=-0.42$, $p<0.01$) between emotionality and birth order as well as between emotionality and number of siblings in the family ($r=-0.39$, $p<0.01$). Sociability correlated positively with length at birth ($r=0.27$, $p<0.05$). Shyness correlated positively with apgar score ($r=0.26$, $p<0.05$). Moreover, regression analyses showed that physical characteristics at birth and family structure are good predictors of children's temperamental traits.

These results support the notion that temperamental traits can be viewed as strategies employed by children to maximize the amount of resources acquired from their social environment. They may also reflect the amount of parental investment at the early stages of development.

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Media, Gossip and Human Universals (Symposium), Chair: Charlotte de Backer
Lecture Hall B, Thursday afternoon

MEDIA, GOSSIP, AND HUMAN UNIVERSALS

This symposium focuses on evolved aspects both of media content and of our behaviour with respect to "media-characters". Media content and gossip are closely related. Once our ancestors began to live in larger social groups, exchanging social information about others may have become adaptive for our ancestors. Gossip creates bonds among group members and serves as a means of social control within the group. However, gossip also functions to construct and manipulate reputations and to exchange

fitness-relevant information. In this respect, gossip can be considered a human universal, just like other evolved interests and behaviours that we find in most human societies. While our ancestors presumably gossiped about those whom they knew personally, today we often gossip about strangers whom we encounter through the media (cf. “parasocial interaction”). Depending in part on our general intelligence, our minds can be fooled into regarding media characters as members of our social network. We expand our group of friends, enemies and acquaintances with imaginary or pseudo-members whom we daily encounter through all sorts of media channels. The same mechanisms that are triggered to focus our attention on fitness-relevant information about real members of our social groups are also triggered when pseudo-encountering media characters. Failing to distinguish between real and pseudo-members of our social networks may be regarded as a means of gaining missing real life friendship satisfaction. Still, general interest in media characters and content seems to be present in most people. Surprisingly, the success of popular media products such as movies is arguably at least somewhat independent of historical or cultural factors, resulting instead from the presence of the topics that triggered the interest of our ancestors, for whom the information in these kinds of stories would have had adaptive value.

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1.30 PM

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ACCIDENTAL LEARNING AT THE MOVIES

In evolutionary perspective, commercially successful movies are successful in part because they trigger evolved attentional mechanisms designed to gather fitness-relevant social information. Our brains are in effect fooled into accepting fictional groups, settings, and dangers as aspects of our own lives. We thus automatically yet avidly attend to gossip-like information about, for example, the reputations and sexual activities of fictional high-status individuals; in the process, we may enjoy fantasy rehearsals of successful strategies for raising and/or recovering our relative standing and winning desirable mates. Our attention in viewing is similar to Chance’s (1967) hedonic attention: a broad information channel is opened through which much unintended incidental education can take place (Barkow 1976). For example, cinematic accidental learning often involves strategies for acquiring status and resolving conflicts with rivals. The strategies followed in Hollywood movies tend to emphasize the individual rather than the group and violence rather than negotiation and compromise. A panoply of expensive artifacts is often presented as associated with high status. Viewers probably gain more information through accidental education while watching commercially successful films than they do from deliberately educational films because the latter are relatively lacking in social-information-attention-triggers. The theory of accidental learning thus accounts for much of the cultural impact of the international film industry. It explains both why “product placement” is a successful marketing strategy and why educational efforts about peaceful conflict resolution are less engaging and probably have less impact on behavior than do Hong Kong “kung fu” movies.

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THE REALLY INTERESTING STORIES ARE THE OLD ONES. EVOLVED INTERESTS IN ECONOMICALLY SUCCESSFUL FILMS FROM HOLLYWOOD AND BOLLYWOOD

In contrast to the widely held view, which assumes humans to be interested in “anything new”, we hypothesize that most people are mainly attracted by “stories” and “news” related to interests our

ancestors evolved in the small groups they constituted. With the advent of large (ultrasocial) societies, the need for more advanced forms of communication and hence for media emerged. Besides allowing for coordination of behavior, both communication and media served “entertainment purposes” (“entertainment” being understood as a processing of observed “interesting” events as not requiring behavioral consequences). We assume these evolved interests should constitute the core of successful entertainment independent of historical or cultural factors (which are, of course, not denied). To test our assumptions, we choose the 25 economically most successful films of all times produced both in Hollywood and Bollywood (a term designating the film production in Hindi concentrated in and around Bombay/Mumbai). To analyze these films, we developed in cooperation with K. Kumar (Media studies, Pune, India) and some other colleagues from Anthropology and Media studies a questionnaire to document topics like “partnership”, “physical danger”, “struggle for resources”, “group conflicts” etc. both in Western and Indian films. This instrument is actually used by “experts” (trained students from media studies) in Siegen and from this summer on in Pune. First results indicate that evolved interests and preferences in fact play the hypothesized basic role but endings of film stories seem to be sometimes modified by the expected entertainment-function for the audience.

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BOWLING WITH YOUR IMAGINARY FRIENDS MAY DEPEND ON YOUR GENERAL INTELLIGENCE

Kanazawa (2004a) proposes that the human brain has difficulty comprehending entities and situations that did not exist in the ancestral environment, and, as one empirical demonstration of this Savanna Principle, Kanazawa (2002) shows that people who watch certain types of TV shows are more satisfied with their friendships, suggesting that they have difficulty distinguishing TV characters and real friends. In an entirely different line of research, Kanazawa (2004b) advances an evolutionary psychological theory of the evolution of general intelligence, which contends that general intelligence evolved in order to handle evolutionarily-novel problems. The convergence of these two separate lines of research leads to the prediction that the human difficulty in dealing with evolutionarily-novel stimuli interacts with their general intelligence. Further analyses of the U.S. General Social Survey indeed demonstrate that less intelligent men and women have greater difficulty separating TV characters from their real friends than more intelligent men and women.

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Because natural selection must act on real outcomes, it is tempting to infer that people's passionate responses to fictive events, such as movies, must be due to a cognitive mistake. At some level, the argument goes, people who watch movies are fooled into believing that the depicted events are happening for real, and this explains their emotional and cognitive responses. However, a great deal of evidence shows that even small children typically have no difficulties distinguishing between fact and fiction. Luckily, people watching *Shrek 2* don't make the terrible mistake of thinking green ogres are part of their social network.

Yet if people are not simply deluded, how can we account for their empathic responses to actors known to be just pretending, to events that didn't actually take place? An attractive hypothesis is that spectator-based fictive forms of entertainment rely on cognitive adaptations for participatory play. Elementary forms of play, such as chasing and fighting, are present in a large number of mammalian species. Evidence

from my observational study of preschool children's chase games suggests that the game's biological function is predator-evasion training. More generally, play appears to be designed to produce learning through behavioral and cognitive rehearsals in simulated scenarios.

However, it is no simple task to engineer an effective learning system based on simulations. The skills acquired in games must transfer to the real world in some manner, without polluting our knowledge of reality with fiction. In this talk I present a cognitive model of how this may be done, using a simple game to explore the components of strategy development. Preliminary data suggests that users typically go through a series of recursive stages, involving both domain-specific and domain-general processes. Largely unconscious Bayesian networks may permit learning from games and movies to integrate in an orderly manner with learning from experience.

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*RECURRENT THEMES IN POPULAR CULTURE ARE AN INEVITABLE RESULT
OF MENTAL EVOLUTION*

Although many students in psychology and sociology are still trained in terms that would please Emile Durkheim and Franz Boas, we argue that culture is not an external force that compels us to behave in particular ways (i.e., "My culture made me what I am.") Culture is better understood as a dependent, rather than an independent variable. Indeed, there is no better mirror to the human mind and its evolved limitations and preferences than commonalities in the forms of culture we create and embrace. Arguably, this principle is nowhere more obvious than in so-called "popular culture" (e.g., films, books, television, sensational news), where content determines success, the stakes are high, selection pressure is severe, and generation time extremely rapid. The human mind resonates to certain themes, a list of which bears an uncanny resemblance to the table of contents of most Evolutionary Psychology textbooks. Although good cinematic or literary technique may contribute to success, it is plainly not a prerequisite (c.f., Stephen King; Danielle Steele). What matters most is content. Since purveyors and consumers of popular culture share a natural history and brain architecture, the search for success is not a matter of trial and error. We argue that cross-cultural similarities in popular culture are far more instructive than superficial differences that reflect local traditions.

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Brain and Cognition, Chair: Steven M. Platek
Lecture Hall C, Thursday afternoon

1.30 PM

Steven M. Platek (1) *, Sarah L. Levin (1), Feroze B. Mohamed (2), Thomas E. Myers (1), Danielle R. Raines (1), Ludivine M. C. Fonteyn (1), Ivan S. Panyavin (1), Jaime W. Thomson (1), James J. Bonaiuto (1), Tyson J. Mitman (1), Danielle R. Arigo (1)

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*DO MALES AND FEMALES USE THE SAME BRAIN REGION TO PROCESS DIFFERENT TYPES OF
SPATIAL INFORMATION: FMRI INVESTIGATION OF SEXUALLY DIFFERENTIATED SPATIAL SKILLS*

Sex differences in spatial cognition have been well documented (see Gaulin 1995 for review) and in fact represent one of the most reliable and robust psychological sex differences – males typically outperform

females on tasks dealing with mental rotation and spatial navigation (e.g., Jordan et al., 2003), while females typically outperform males on tasks dealing with object location (Eals & Silverman, 1992, 1994) and spatial working memory (Duff & Hampson, 2001; McBurney et al., 1997). These behavioural sex differences are hypothesized to have evolved from disruptive selection arising out of sexual division of foraging labor (McBurney et al., 1997). While there has been a large amount of research demonstrating neurocognitive sex differences in spatial cognition no study has directly compared sexually differentiated spatial abilities using functional neuroimaging. Here we investigated sex differences in behavioural and neural correlates of two sexually differentiated spatial abilities – mental rotation and spatial working memory. It was found that males and females employ similar areas of the medial frontal lobe when solving tasks they are proficient at. These findings suggest that natural selection capitalized on selection for sexually-differentiated modules that allows for adaptive execution of spatial skills within sex.

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POLYMORPHISM OF HANDEDNESS AND SOCIO-ECONOMIC STATUS IN WESTERN SOCIETIES

Humans exhibit hand preference for most manual activities in which they are specialized. Right- and left-handers have coexisted at least since the Upper Palaeolithic. Left-handers are in the minority in all human populations, although there are variations in frequency. The persistence of the polymorphism of handedness is a puzzle, because this trait is substantially heritable and several fitness costs are associated with left-handedness. Some countervailing benefit is required to maintain the polymorphism. The frequency-dependent advantage in fights, existing in traditional societies, probably has only a moderate effect in western countries. There are differences in brain organization between right- and left-handers. This could result in an advantage for left-handers concerning socio-economic status. Here we tested this hypothesis on a French population using two large data sets: SUVIMAX and GAZEL (totaling more than 30.000 individuals), and several socio-economic status indicators. The results will be discussed in the context of current evolutionary theories on handedness, including frequency-dependent selection mechanisms maintaining left-handedness in human populations.

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2.10 PM

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MEASURING THE INFLUENCE OF GENOMIC IMPRINTING ON HUMAN BRAIN DEVELOPMENT VIA INTRA-FAMILIAL CORRELATIONS

Genomic imprinting refers to the differential expression of a gene depending on whether it is inherited from the male or female parent. Animal experiments and human clinical studies have both suggested that genomic imprinting is influential in brain development, with the maternal genome playing a disproportionate role in the development of select areas of the neocortex. The present study is the first to investigate this phenomenon in a non-clinical human population, using an original method of ascertaining genomic imprinting based on intrafamilial correlations. As predicted, the investigators found that abilities assumed to be mediated by frontal, parietal and temporal lobes were more closely correlated between children and their mothers, compared to their fathers. Differences for occipital lobe function were neither predicted nor obtained. The implications of these findings for the prevailing theory of the evolution of genomic imprinting, and for the general study of genetics and behavior, are discussed.

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AN EVOLVED COGNITIVE SYSTEM: THE CASE OF NUMBER

How do humans think about number? Early graphic notation of number by ancient civilizations such as the Egyptians, Greeks, Persians, Romans, suggest that humans tallied numerosities using a simple 'I' up to III or IIII; after the numerosity 4, different symbols were used to represent them. Anthropological studies show that hunter-gatherer civilizations also seem to 'count' using particular symbols for numbers up to 3,4. For example, an agraphic tribe in the Brazilian Amazonia, the Pirahã, uses specific nouns for 1 and 2, a compound noun for 3, and a mass noun for 'many'.

Recent evidence from human infant and animal research (see, e.g., Uller et al. 2003 for a review) suggests that there are two systems for number representation. One is an indexing system for small numbers (up to 3 or 4). The other, a symbolic system for large numbers. The nature of such numerical representations, however, still remains under much debate. For example, pre-linguistic infants have been shown to spontaneously apprehend, understand, and manipulate numbers up to 3 or 4. Nonhuman primates have incredible computational resources for numerical processing, mostly under training conditions, but have also been shown to spontaneously operate on numbers up to 3,4. Experiments with a species of amphibian suggest that a precursory system for small number may have been in existence for several millions of years.

In this paper, I will further develop the idea that number is an evolved cognitive system, offering a framework and providing examples.

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2.50 PM

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A COGNITIVE BASIS FOR CARDINAL UTILITY

There is plenty of evidence that nearly everything coming into the human "in-box", from size, weight, and numerosness, to consumption and income, to moral behavior and pain, is judged against a collection of reference points. While the existing research in "psychology and economics" aims to incorporate this apparent relativity of judgements into economic models, the present paper takes a different approach by asking the following questions: How big is an apple? How large is a salary? How intense is an experience? How long is a piece of string? How can we tell?

To answer these questions, the present paper explores the "measuring tools" that evolution has endowed humans. It is argued that with only a minimal set of cognitive tools - ordinal comparison and frequency processing - an object can be evaluated by its relative position in a reference set. As development psychologists show, human infants seem able to make ordinal comparisons as early as before reaching their first birthday, and furthermore, cognitive and evolutionary psychologists argue that humans are endowed with well-working system of dealing with frequency information. This cognitive evaluation, coupled with "more is better" preferences, is consistent with possession of a cardinal utility function. This cardinal utility function is determined by one's environment, so that a given object of a fixed size will be evaluated differently in different contexts. The proposed theoretical model is flexible enough to incorporate various cognitive imperfections (such as Weber's law and Rubinstein's similarity condition) and to explain existing experimental observations.

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Kinship, Chair: X. T. Wang
Lecture Hall D, Thursday afternoon

1.30 PM

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WHY DO PEOPLE WHO ARE CLOSE TO THEIR RELATIVES HAVE MORE CHILDREN?

Demographic studies of modernizing populations have shown that, as social networks widen, members of those networks begin to choose to limit the size of their families. It is possible that evolutionary theory can provide an explanation for this. Wider social networks allow relatively less contact with kin, those who have a genetic interest in supporting each other's reproduction. If this is the case, what might be the nature of the support from kin? Does a reduction in the practical support from kin cause people to want to burden themselves with fewer children? Or is it that people in wider social networks receive less **social** support for reproduction – less encouragement to reproduce. Our evidence suggests that lack of encouragement is a more important factor especially as this affect is likely to accumulate over time (as described by Boyd & Richerson, 1985) and lead to an evolution of cultural norms that do not facilitate reproduction. We will present evidence that in low fertility cultures, greater contact with kin is associated with behaviour likely to lead to reproductive success but a similar association with practical support from kin is not in evidence.

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KINSHIP, ETHNICITY AND SEX: A RUSSIAN STUDY OF RISK TAKING

The study took an evolutionary approach to both universal features and cultural variations in risk taking. Kin selection theory affords a "kith-and-kin" rationality sensitive to group content and context. Risk sensitive foraging theory brings attention to fitness-related decision references (i.e., survival requirements and reproductive goals) and payoff distributions. Sexual selection theory provides a rationale for predicting that men, especially young men, would be more willing than women to take risks as a function of their steeper discounting of future. A total of 1100 Russian participants were presented with different risky choice problems which entailed a binary choice between a sure option and a gamble of equal expected value. Consistent with our evolutionary hypotheses, Russian participants were more risk taking in making life-saving choices in kith-and-kin group contexts than in large group contexts. The risk-taking preference was significantly reduced in monetary domain where the minimum requirement was expected be more flexible. Russian men were more risk seeking than Russian women. This sex difference was largely due to a sharp decline in risk-taking choice of women in and only in the life domain where a large number of lives were at stake. In such a situation, Russian women also were more susceptible than men to verbal framing of choice outcomes. This indecisiveness (the framing effect) in risk preference was most evident when the lives at stake were Americans rather than Russians. As predicted, a significant negative correlation between the proneness to risk-taking and life-expectancy was obtained among men but not women.

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CONTEXT-SPECIFIC EFFECTS OF FACIAL RESEMBLANCE ON TRUSTWORTHINESS AND SEXUAL ATTRACTIVENESS

Due to the fitness benefits of helping kin, positive effects of kinship cues are predicted for prosocial attributions. In contrast, negative effects are predicted in the domain of mate choice due to the costs of inbreeding. If humans are sensitive to the costs and benefits of favouring kin in different circumstances, cues of relatedness will have a positive effect on prosocial feelings toward other-sex individuals, but will have a negative effect on their sexual attractiveness. I show that images of other-sex faces that were subtly manipulated in the possible kinship cue of facial resemblance were judged as more trustworthy by the participants they resembled than by control participants. In contrast, self-resemblance did not enhance the perceived attractiveness of these same faces. Self-resemblance had no effect on attractiveness judgments of potential long-term partners, for whom both prosocial regard and sexual appeal are important criteria, and a negative effect on attractiveness judgments of potential short-term partners, for whom sexual appeal is the dominant concern. The differential effects of self-resemblance on judgments of trustworthiness and sexual attractiveness provide evidence against explanations invoking a general preference for familiar-looking stimuli. Instead, the results suggest that facial resemblance is used as a cue of kinship which is specially processed in a manner that is sensitive to the context in which faces are judged.

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THE IDENTIFICATION OF DISTANT KIN

Since William Hamilton, evolutionists have realized the importance of kinship distance. In accordance with the theory of kin selection, many studies have shown systematic favoritism of closer kin over more distant kin. Humans, however, in addition to the use of kin terms to identify closer kin, everywhere also distinguish genealogical distance among very distant kinsmen, and show systematic favoritism of closer kin at distances that are not in accordance with kin selection.

We propose that this fundamental aspect of human social behavior is the result of certain traditions. In perhaps all tribal societies clan (or "descent", or "family") names are passed from one generation to the next, usually through one sex only. Contrary to common assertions, these names do not necessarily identify social groups. Instead, they are used to identify individuals as co-descendants -- kin. Sub-clan (or "lineage") names, by identifying closer common ancestors, are used to identify closer kin within clan categories. Individuals, regardless of their own name, use the clan or sub-clan name of ANY identified ancestor -- through any parent, grandparent, or great-grandparent, for example -- to identify common ancestors, and hence co-descendants, as kin. The systematic favoritism and willingness to cooperate shown toward individuals identified through clan and sub-clan names is encouraged by additional traditions, especially ancestor worship. Tests of this hypothesis are proposed.

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KINSHIP AND ULTIMATUM DECISIONS

The ultimatum game is frequently used as an experimental tool for measuring cooperation. It is simple, grants real monetary rewards, and can be applied in a variety of contexts. Here I explored the effects of kinship between partners in the game, in Hermel, Lebanon. Specifically, I examined the effect of paternal relatedness on offer sizes and acceptance rates as measures of cooperative interactions. The project also aimed at distinguishing between instances of kin cooperation based on kin selection and those based on reciprocal altruism. With lower degrees of relatedness, the value of the exchanged favor rather than the propagated allele is the currency of the exchange. This is expected to be reflected in offer sizes and acceptance rates. The lower the degree of relatedness the closer offer size is to that of non-related individuals. Subjects fell in three groups, Joub (lineage) (higher r), clan (lower r) and a random sample from the population (negligible r). Subjects in the higher r group made the highest offer value on average, followed by lower r followed by the random sample. No significant difference was found between clan and community average offer values, but significant difference was found between those of Joub and community.

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Remembering What Linda Mealey Said (Symposium), Chair: Nancy Segal Audimax, Thursday afternoon

TWIN STUDIES, SEX DIFFERENCES AND PSYCHOPATHOLOGY: REMEMBERING WHAT LINDA MEALEY SAID

This symposium is intended to honor the life and work of Linda Mealey, our late friend colleague. Linda passed away in November, 2002 when her career was heading in exciting new directions. Her recent work revolved around common areas of study for evolutionary psychology and behavioral genetics. Her 2001 chapter in the volume, *Conceptual Challenges in Evolutionary Psychology* (H. Holcomb, Ed.) was appropriately entitled, "Kinship: The Tie that Binds Disciplines." But Linda authored a number of seminal works in her career. Included among them are her 1999 study, "Symmetry and Perceived Facial Attractiveness: A Monozygotic Co-Twin Comparison," published in the *Journal of Personality and Social Psychology*; her 1995 article, "The Sociobiology of Sociopathy: An Integrated Evolutionary Model," published in *Behavioral and Brain Sciences*; and her 2000 textbook, *Sex Differences: Development and Evolutionary Strategies*. Linda also contributed a chapter, "Evolutionary psychopathology and abnormal development" to an edited volume that is currently in press. This volume, entitled, "Evolutionary Perspectives on Human Development," is edited by Robert L. Burgess and Kevin MacDonald, and will be published by Sage Publications.

The three members of this panel and the two discussants will examine selected aspects of Linda's work and consider the impact of her research on current theory and practice in evolutionary theory. These individuals include Nancy L. Segal (Symposium Organizer and Presenter), Russell Gardner (Presenter), Andy Thomson (Presenter), Uli Mueller (Discussant and Hans-Peter Kohler (Discussant).

Nancy Segal will review selected areas of twin research and detail the connections that Linda tried to draw between behavioral genetics and evolutionary psychology. She will also describe some of her own twin study collaborations with Linda, and describe some new directions that Linda's work suggests. Russell Gardner will reviews Linda's research and approach to sex differences and comment on her investigations with twins. He will also describe Linda's interests in clinical applications of evolutionary-based studies and the use of clinical findings as tools. Consideration of how her research would have affected evolutionary psychiatry and clinical practice in the future will be presented. Andy Thomson will discuss Linda's work on anorexia, in particular the reproductive suppression model and implications for therapy with reference to female/female competition conflicts. He wil also discuss other clinical applications of Linda's work, with a focus on sex differences, depression and suicide. Both Uli Mueller and Han-Peter Kohler will comment on Linda Mealey's work from their own areas of expertise.

In addition to the review and examination of Linda Mealey's scholarly contributions, Nancy Segal will show a video tape and slide presentation covering segments of Linda's life. Panelists will share personal thoughts about Linda, and members of the audience will also be invited to do so.

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4.35 PM

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TWIN STUDIES AND EVOLUTIONARY PSYCHOLOGY: OVERVIEW OF LINDA MEALEY'S LIFE AND WORK

In later years, Linda Mealey was concerned with identifying common areas of interest for behavioral genetics and evolutionary psychology. Her 2001 chapter in the volume, *Conceptual Challenges in Evolutionary Psychology* (H. Holcomb, Ed.) was appropriately entitled, "Kinship: The Tie that Binds Disciplines." Her work on facial asymmetry in twins, published in the *Journal of Personality and Social Psychology*, was one of the most creative applications of behavioral-genetic methodology for testing an evolutionary-based hypothesis. Linda extended this work in an unpublished paper and in several published works. I will review this area and some of my own twin study collaborations with Linda, and describe some new directions that Linda's work suggests. I will also show a slide presentation and video tape of Linda, commenting on her interests and goals.

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Russell Gardner
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SEX DIFFERENCE RESEARCH: MEALEY'S SEARCH FOR FEMALE- MALE COMPARISONS

In her career, characterized by energetic involvement, Linda Mealey produced an important book on sex difference research, entitled *Sex Differences: Developmental and Evolutionary Strategies*. I will review her approach and major findings, including her focus on twin research to assess trait heritability. Also, I will discuss her interaction with ethology (President of the International Society of Human Ethology) and with the search in psychiatry for a coherent and comprehensive basic science (she was chair of the Beck Award committee for The Across-Species Comparisons and Psychopathology (ASCAP) Society. Mealey was a "lumper" more than a "splitter" engagingly capable of bringing people together in the cause held in common, namely using evolutionary biology in all the various ways that it shows its traces to further understanding and data-collection. The clinical realm of psychiatry fascinated her because she perceived the specialist in that domain to possess a vantage point for directly observing behavior (applied ethology), making inferences from central nervous system research as it applies to normal and pathological behavior, as well as appreciating the stories that patients tell. She bonded people together with her vigorous leadership style and we're all the beneficiaries in the wake of her untimely death.

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5.15 PM

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LINDA MEALEY'S CLINICAL LEGACY

Linda Mealey's legacy extends to the clinical application of evolutionary psychology. Throughout her all too brief career she cared deeply about human suffering. Her comprehensive review of sociopathy with an evolutionary model still provides forensic clinicians with a nuanced view that avoids the pitfalls of the present classification system. The current DSM (Diagnostic and Statistical Manual) model sacrifices discrimination for accuracy and may hurt criminal defendants who are too quickly labeled sociopaths. When utilized, Linda's work on anorexia nervosa permits a needed corrective to models of eating disorder treatment approaches which continue to be based on old theories with no empirical support. Anchored in a reproductive suppression framework, Linda's formulation directs clinicians to probe female/female competition as part of the treatment. Her textbook on sex differences contains a superb section on clinical issues, with a focus on the sex differences in stress, depression and suicide, as well as a trenchant critique of DSM and gender biases in diagnosis. At the time of her death she had written a draft of a comprehensive psychopathology from an evolutionary perspective. This presentation will review the clinical implications of Linda Mealey's work.

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Mate Preferences I, Chair: Boguslaw Pawlowski Lecture Hall A, Thursday afternoon

4.35 PM

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THE OBJECT OF DESIRE: MALE SEXUAL ATTRACTIVENESS MODERATES OVULATORY SHIFTS IN WOMEN'S IN-PAIR AND EXTRA-PAIR DESIRES

Female desire for extra-pair mating may be designed to secure genes for higher quality offspring when a woman's choice of a primary mate is constrained. If true, women's extra-pair desires should peak near ovulation, when the genetic benefits are maximized, but only for those women mated to primary partners low on sexually attractive indicators of good genes. Women mated to sexually attractive partners should exhibit a reversal of this pattern for in-pair sexual desire. Normally ovulating women came to the laboratory on several occasions, once for demographic testing and partner ratings, once on a high fertility day of the cycle (reverse cycle day 16-18), once on a low fertility day, and several times for lutenizing hormone tests (to confirm ovulation). During high and low fertility sessions , women reported sexual desire for their primary partners, flirtation and attraction to extra-pair mates, and several other variables. Contrary to other studies, we observed a main effect of fertility on in-pair desires; on average all women showed increases in attraction to their primary mates at high fertility. As predicted, however, this effect was moderated by partner sexual attractiveness. We observed midcycle increases in women who rated their primary partners as sexually attractive ($r = .43$, $p = .05$), while increases in extra-pair desire were found among women with partners low on sexual attractiveness ($r = -.51$, $p = .01$). This pattern of results suggests that women's sexual desire has evolved to respond to cues linked with variable fitness payoffs in ancestral environments.

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*ARE THE TRAITS WE PREFER IN POTENTIAL MATES THE TRAITS THEY VALUE IN THEMSELVES?
AN ANALYSIS OF GENDER DIFFERENCES IN THE SELF-CONCEPT*

Men place greater importance on traits representing youth and beauty in potential mates, whereas women place more importance on traits indicating status and resources. Over evolutionary time, these differential preferences should have shaped individual's self-concept. 5 studies tested the hypothesis that men should place greater importance on traits that reflect their status, whereas women should place more importance on traits that reflect their physical appeal. A self-report study (Study 1), and a modified Stroop Task (Study 2), showed that men more highly valued in themselves traits related to status, whereas women valued traits related to physical attractiveness. Study 3 and 4 asked men and women to imagine having a pleasant discussion with an opposite-sex individual, and then being derogated by a same-sex competitor on their status or physical attractiveness. Men were more upset at the thought of being derogated on their status, whereas women were more upset at the thought of being derogated on their physical attractiveness. Participants in Study 5 believed they had the opportunity to win a lunch date with a member of the opposite sex. They answered questions about themselves that were asked by an opposite-sex research confederate, in the presence of a same-sex competitor (also a confederate), and were derogated on their status, physical attractiveness, or not at all, by the competitor during the interview. Results were identical to those obtained in studies 3 and 4. It is suggested that the self-concept has been shaped by the preferences of mates over evolutionary history.

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CHOOSING A MATE ON TWO DIMENSIONS: TRADE-OFFS, ISOCLINES AND AGE EFFECTS

Choosing a mate involves judgement of a number of attributes. How do individuals combine these judgements to select a potential mate? We describe a method for measuring the way in which individuals trade off the importance of two different attributes in judging the desirability of a potential partner. The method allows quantification of the equivalence of two different mate qualities; for example, the degree of facial attractiveness a woman would forgo in one partner in order to gain another who had, say, an additional £20,000 a year in salary. Isoclines can be drawn to show combinations of attributes of equal desirability. The method can be used to test hypotheses about the relative importance of different mate qualities as a function of variables of adaptive interest. We present the results of a study of female mate choice showing how the trade-off between a male's facial attractiveness and his salary varies with the absolute level of attractiveness and with female age.

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*USING DRAWINGS OF PAIRS SHOWING DIFFERENT DEGREES OF SEXUAL DIMORPHISM IN
HEIGHT (SDH) IN A NEW METHOD FOR DETECTING MATE PREFERENCES*

Human mate preferences are related to many morphological traits of a potential partner. One such important trait is a partner's height. The use of drawings of human couples showing different degrees of sexual dimorphism in height (SDH) is proposed in a new method for detecting not only mate preferences

but also expectations about height difference between heterosexual partners. This method revealed that men and women prefer different SDH values for themselves and their potential partner and that this preference depends on the subject's height. The biological bases of such plastic preferences and a possible psychic mechanism that could explain the different choices will be presented.

Another question which will be posed is whether this plasticity is related only to a subject's height. There is also the possibility of using this method for detecting women's choices in relation to their menstrual phases and also in relation to the sexual strategy that they might pursue.

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*DO ALL WOMEN FAVOR HIGH-STATUS MEN?
NEW RESULTS ON SEX AND EDUCATIONAL DIFFERENCES IN MATING PREFERENCES*

Research on mating preferences has focused especially on the role of socioeconomic status (SES) and physical attractiveness (PA). Usually it is emphasized that men attach greater importance to PA in a partner, whereas women prefer men with a high SES. However, this emphasis has often led to an overstated dichotomy between male status and female beauty, in which cultural and social variability were often neglected. A recent German study on young singles not currently in a relationship found the effect of educational level on SES and PA preferences was higher than the sex difference, which was only small (PASHOS 2002, PASHOS & NIEMITZ 2003). Here I report results of a second study that included people in relationships as well as singles. The effect of education on mating preferences was confirmed. In addition, the importance placed on one's own financial and occupational success had a very large effect on the financial and occupational status desired in a partner. However, the effects of sex and education, although much smaller, cannot be explained by this. In the first study I found a sex difference in desiring a celebrity partner. Unexpectedly, men more than women liked the idea of a celebrity partner. Study 2 confirmed in this difference. In addition, it emerged that men rather than women would find it desirable to be a celebrity. The results are discussed in connection with main theories explaining sex differences in mating preferences.

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THE IDEAL (WO)MAN: SIMILARITIES AND DIFFERENCES IN OPPOSITE SEX ATTRACTION

Introduction: Previous studies concerned with opposite sex mate attraction have tended to emphasise sex differences rather than considering inter-sex similarities. Furthermore, the majority of these studies have been carried out with samples drawn from the USA population. This study explores both similarities and differences in the rating of (un)desirable traits in opposite sex long-term partners by males and females from the UK.

Methods: Data was collected from 25 heterosexual male and 25 heterosexual female volunteers using a trait desirability questionnaire drawn from Todosijevic, Lubinkovic & Arancic (2003). The questionnaire contained 60 traits that could be rated from completely undesirable to most desirable.

Results: Significant sex differences were identified in 14 of the traits, including physical attractiveness and dominance. When the ten most desirable traits in the opposite sex were examined separately for males and females there was correspondence on six of these, with faithfulness being rated highest by both sexes. Furthermore, there was inter-sex correspondence on eight of the ten least desired traits, e.g. jealousy and aggressiveness.

Discussion: The 14 traits signalling sexual dimorphism in opposite sex attraction are in keeping with the predictions of sexual selection theory, but can also be explained at a socio-cultural level. However, that the traits show inter-sexual similarities is an interesting finding demonstrating a universality in heterosexual mate attraction. All inter-sex similarities are discussed with reference to both evolutionary and socio-cultural theories.

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Media, Gossip and Human Universals (Symposium) / ToM and Culture,
Chairs: Charlotte de Backer / Lisa Zunshine
Lecture Hall B, Thursday afternoon

4.35 PM

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DAYTIME TALK SHOWS AS VIRTUAL GOSSIP GROUPS

If Robin Dunbar is right with his idea, that language developed from grooming, language must play a crucial part in forming communities. Language is not only a mean to exchange information, but also a mean to define groups. To share gossip means to be part of a community. Who is telling what "secret" to whom defines relationships. The person who is trusted most knows the most "secrets". To be close to that person means to be well informed about the status of others. Daily Talk Shows simulate private talking. Viewers learn secrets and get an intimate look into other people's privacy.

I investigated 441 screenings of four different shows (Fliege, Meiser, Arabella and Vera am Mittag) on German TV, categorized them into groups (health and body, sexual activities, political activities, partnership, parent-child relationships, birth and death, role models, reputation and reliability, hierarchy) and related them to the ratings. The hosts of the show were more important for the ratings than the subjects they talked about. All subjects had about the same mean numbers of viewers, since all hosts used more or less the same categories. But the host had a significant influence on how many viewers turned their TV-set on to one of the shows.

This suggests that the group that forms a gossip community is more important than the issues the group talks about. The host is in the center of a group and the community at home is invited to be part of that virtual group.

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*IS PAMELA ANDERSON DYING FROM HEPATITIS C? TABLOIDS: A CHEAP MEANS
TO GATHER LIFE EXPERIENCE*

From an evolutionary perspective, we propose that the value of gossip content depends on the chance of encounter, social status, impact factor, and valuable traits of the subject, and transmitted information about fitness-relevant behavior. Gossip serves as a tool to construct and manipulate reputations, and a simple heuristic to gather life experience without investing own time, energy and risks. Both strategies make gossip about members of our social network adaptive, but a by-product is our present interest in celebrity gossip. Interest in celebrities can be explained as an example of our stone aged brains not adapted to the present environment. We may regard celebrities as pseudo-members of our social network and show interest in gossip about them, for the same reasons we value gossip about real

members of our social network. Through the media we pseudo-encounter these high status celebrities with valuable traits, who transmit information about fitness-relevant behavior. To test our assumptions, we surveyed 104 American and 838 Belgian subjects about their interest in celebrity gossip, measured their media exposure (as an indication of pseudo-encounters), and asked questions about their life history. Results show that people who are less satisfied with their real life friendships show more interest in celebrity gossip. Further, highest interest is measured for stories about health issues, cheater detection, and altruism detection. Finally, when controlling for sex and life stage, we concluded that respondents use celebrity gossip as a medium to learn future fitness-relevant strategies. This learning can be compared to juvenile play behavior.

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WHY IS GOSSIP SO IRRESISTIBLE? EXPLORATIONS IN THE EVOLUTIONARY PSYCHOLOGY OF GOSSIP

Three experiments tested hypotheses about gossip derived from an evolutionary perspective. The results of these experiments confirmed a consistent pattern of interest in gossip marked by a preference for information about others of the same age and gender. Exploitable information in the form of damaging, negative news about nonallies and rivals and positive news about allies was especially prized and likely to be passed on. The findings confirm that gossip can serve as a strategy of status enhancement and function in the interests of individuals, and that it does not just function as a means of social control within groups.

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DEATH UNDERSTANDING IN A MEAT-EATING PRIMATE

Despite many years of research, there is still uncertainty about what children understand about death, and when. Part of this uncertainty stems from a failure to consider the ecological contexts in which distinguishing living from dead things might be useful. Here I propose that one function of death understanding is to allow children and adults to discriminate between living animals, which could hurt them, and dead animals, which could not. This could be a useful skill in a species that interacts with other animals both as predators and prey. I present the results of two experiments suggesting that children possess distinct ontological categories for living things (intentional agents) and dead things (biological substances, or meat), and that they can use cues to death to remap an animal from one category to the other. I discuss some of the implications of these findings for human culture.

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*DOES THE AUTISTIC CHILD HAVE A THEORY OF SOCIETY? AN EVOLVED, SPECIAL-PURPOSE
CAPACITY FOR HUMAN SOCIALITY*

An extensive literature supports the claim for a domain-specific capacity for reasoning about the behavior of others in terms of mental states, viz., a theory of mind module (ToMM). The further claim that ToMM is an evolved adaption is supported by considerable evidence that a specific brain impairment – autism – disrupts ToMM reasoning, whereas other presumably modular and evolved adaptations like folkbiology and naive physics remain unaffected by autism. The evolutionary significance of ToMM has been emphasized by several scholar, a number of whom have argued that the ToMM is the principal adaptation underlying the emergence of the unique and distinctly cultural sociality of modern humans. The import of the capacity to explain behavior in terms of mental cannot be denied. However, there are other folk strategies for explaining the behavior of other, and in fact they may be more frequently on-line than ToM. In particular, explanations about behavior based on the kind of person an actor is a fundamental and cultural mode of reasoning. Psychological accounts generally treat such group-based reasoning as the convergence of general category skills with ToM-based and inter-individually-derived reasoning strategies. I propose an alternative hypothesis arguing that group-based explanations of behavior are the output of a distinct modular capacity. Recent work with autistic children provides strong support for the autonomy of an endogenous, evolved folk theory of society.

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WHY DO WE READ FICTION?

I bring together recent research in Theory of Mind and metarepresentationality to argue that this research allows literary critics interested in cognitive-evolutionary approaches to fiction to begin asking the following questions: Is it possible that literary narrative trains our capacity for mind-reading and also tests its limits? How do different cultural-historical milieus encourage different literary explorations of this capacity? How do different genres? Specifically, I consider the possibility that certain genre designations, such as “detective” or “romance,” could be viewed as shorthand expressions of our intuitive awareness that fictional texts can engage and experiment with cognitive adaptations within our Theory of Mind in recognizably distinctive ways.

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Fertility and Fitness, Chair: Jeffrey Schank
Lecture Hall C, Thursday afternoon

4.35 PM

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INSTITUTIONALISED CELIBACY AS AN ADAPTIVE STRATEGY: EVIDENCE FROM AN HISTORICAL IRISH POPULATION

This study examines the socio-economic and familial background of Irish Catholic priest born between 1867 and 1911. Previous research shows that adopting a celibate lifestyle as part of a religious institution is more likely to occur among landholders and those that practice a system of impartible inheritance (e.g. Portuguese nobility; Boone, 1988). Studies of Tibetan monks (e.g. Crook and Osmaston, 1994) emphasise lack of marriage opportunities and lineage survival amongst factors influencing entry into celibate life. The present study traced data for 46 Catholic priests from Irish Seminary registries, who were born in County Limerick. The 1901 Irish Census returns were used to acquire family composition data (birth order, number and sex of siblings). Heads of priest households were located in Land Valuation records to ascertain measures of family wealth (property value, land value and acreage). Priests were significantly more likely to originate from landholding backgrounds, and with landholdings significantly greater in size and wealth than the local average. Priests were found to originate from families with large sibling sets, with significantly more brothers than sisters. These findings are discussed in relation to lineage survival strategies and local resource competition theory.

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FERTILITY TRANSITION DRIVEN BY POVERTY: THE CASE OF ADDIS ABABA, ETHIOPIA

Demographic Transition Theory states that fertility decline in the Western World began with the affluent and followed by the poor. Considering such scenario, some of the developing countries are applying the 'development is the best contraceptive' approach while others focus on expanding provision of family planning services to reduce periodic population growth rate highly influenced by births to individual women. Contrary to this, a very low level of fertility is observed in Addis Ababa where contraceptive prevalence rate is modest and recurrent famine as well as drought are major causes of economic crisis for more than three consecutive decades.

Multivariate analysis of the life history data of 2976 women of reproductive age (i.e. 15-49 years) interviewed during the first quarter of 2003 revealed that low fertility in Addis Ababa is in response to chronic poverty in the capital. Controlling for the confounding effects of maternal birth cohort, migration status, education, ethnic group, marital status and accessible income level, the poor (those who have access to less than a dollar per day or 250 birr a month) were observed to elongate the timing of having first and second births while relatively better off women were found to have shorter birth intervals. Qualitative information collected through FGD and in-depth interviews also support the statistical findings. The mystery behind the below replacement-level fertility of Addis Ababa (TFR = 1.9 children per woman) appear to incline towards evolutionary theory that states that chances of procreation are diminished in individuals with scarce resources.

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*HEIGHT, MARRIAGE AND REPRODUCTIVE SUCCESS: HOW A GAMBIAN POPULATION
COMPARES TO THE WEST*

Research in Western societies has shown that height is positively correlated with reproductive success (RS) in men, but negatively correlated with RS in women. Both relationships have been attributed to sexual selection: Western women prefer tall men, Western men prefer short women, and both sexes prefer partnerships in which the man is taller than the woman. We investigate the relationship between height and RS in both men and women in a subsistence farming community in rural Gambia. In contrast to the Western studies, there is clear evidence for a positive relationship between height and RS for women, but only rather weak evidence for a positive relationship between height and RS for men. For women, this relationship appears to be mediated by the physiological advantages of growing tall. In particular, the children of tall women have higher survival rates than those of shorter women. We go on to investigate relationships between height and marriage patterns in the Gambia. Again in contrast to the West, we find mixed evidence that height is used as a cue to a desirable mate in this society. Though tall men do contract more marriages than shorter men, there is no evidence for positive assortative mating for height, nor is there any evidence for a male-taller norm: the proportion of marriages in which the husband is shorter than the wife is no different from that expected by chance. We suggest environmental context is important when investigating mate choice strategies, and recommend more cross-cultural research in this area.

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SOCIAL STATUS AND FERTILITY IN THE CONTEMPORARY U.S

Evolutionary discussions on the relationship between social status and fertility in post-industrial countries typically cite a negative correlation. The published data for post-WWII Americans, however, are sparse, incomplete, and equivocal. In the present study, we use education and income to predict age at first child, childlessness, and number of children for men and women in two samples – one of the general American population and one of graduates of an elite American university. We find that increased education is strongly associated with delayed childbearing in both sexes and is also moderately associated with decreased completed fertility. Women in the general population with higher income have fewer children (even after controlling for the effects of education), but this relationship does not hold among those with elite educations. Men's income, however, is not associated with reduced fertility in the general population and in fact predicts lower childlessness rates. Further, higher income in men is positively associated with fertility among those with elite educations as well as within the general population after controlling for education. Such findings undermine simple statements on the relationship between status and fertility.

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A REEVALUATION OF MENSTRUAL SYNCHRONY

Menstrual onset dates were prospectively collected from 186 female students at North Sichuan Medical College, residing in 29 rooms (four to eight per room) for over a year. The Kupier-Stephens test was used to detect presumptive cases of synchrony in groups. A bootstrap approach was used to detect synchrony over all groups in rooms. Four statistics assessed synchrony for the bootstrap: the (1) mean of the absolute deviations from the mean of a set of onset dates in a group (MADM); (2) mean of the absolute pair-wise deviations for a set of onset dates (MAPD); (3) Kupier-Stephens statistic (V_n); and (4) number of groups for which V_n was significant. Results: Nine groups exhibited significant deviations from uniformity. Upon graphing, all resulted from incidental convergences due to variable cycles. For the bootstrap, no significant effects of synchrony were found. Two bootstrap statistics proved useful in interpreting previous results and phenomena. First, the expected value of MADM for regular cycles ranges from 4.98 to 5.27 for 28 to 30 day cycles. McClintock (1971) reported that women synchronized their cycles at a stable level of about 5. Thus, the original results were a mathematical artifact of the statistical properties of MADM. Second, almost a third of the groups exhibited temporary cycle convergences, which is much higher than expected by chance for regular cycles. This may explain the common perception among women that living in groups synchronizes cycles. Finally, implications of variable cycles for the evolution of human mating strategies are discussed.

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Personality / Adaptive Functions of Memory, Chairs: Daniel Nettle / Ulrich Hoffrage Lecture Hall D, Thursday afternoon

4.35 PM

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PERSONALITY AS LIFE-HISTORY STRATEGY: THE FITNESS BENEFITS AND COSTS OF INDIVIDUAL DIFFERENCES IN EXTRAVERSION

Placing personality within the project of evolutionary psychology is not straightforward. This is because natural selection is expected to use up heritable variation and produce optimal, species-typical mechanisms with no variation. Yet personality psychology has shown that there are substantial individual differences in broad classes of behaviour, differences that have a partly heritable basis. I argue that 'personality' should be seen as population variation in mechanisms regulating life-history decisions. Similar variation is maintained in many animal populations. It is under stabilizing selection, but is not eliminated entirely for reasons which will be discussed. The model predicts that the major personality dimensions will be correlated with different reproductive strategies, and that there will be fitness disadvantages at both extremes of the distribution. I illustrate the theory with data from a recent questionnaire study of extraversion in British adults ($n=569$). Compared to low scorers, high scorers have more sexual partners and more extra-pair copulations. They have an increased likelihood of having children with more than one partner. It is suggested that the cost of this strategy is either increased physical risk to the person, or increased risk to the offspring. The data shows trends consistent with the former possibility.

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HIGH GENETIC VARIANCE IN GENERAL INTELLIGENCE (G) ENDOPHENOTYPES: EVIDENCE IN FAVOR OF A FITNESS INDICATOR INTERPRETATION

Spearman's g factor of general intelligence shows relations to human performance in various fitness-related domains, from health to mating. Yet it is profoundly heritable. The maintenance of genetic variance in g is puzzling if it is perceived as a mental adaptation under stabilizing selection, but expectable if viewed as a prime component of fitness itself.

The latter position is taken by Miller's Pleiotropic Mutation Model, which states that g reflects individual differences in the overall load of mutations that deter cognitive functioning. Since substantial parts of the genome have the potential to do so, the model predicts high genetic variance in g.

I will present findings from re-analyses of quantitative behavioral genetic studies of g endophenotypes, which converges with evidence from population genetics, molecular genetics, and simulations of g inheritance to form considerable support for this prediction.

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THE PERSONALITY JUDGMENT INSTINCT

The Realistic Accuracy Model (RAM) describes the four stage, social-behavioral process necessary for the achievement of accuracy in personality judgment. A judgmental target must emit (1) relevant information in a context where it is (2) available to the judge, who must then (3) detect and correctly (4) utilize this information. This model implies that accuracy is a difficult attainment, and yet useful levels of accuracy are routinely observed, which suggests there may be a sort of instinct for personality judgment, akin to the "language instinct," that allows the cognitive system to go beyond the information given. A further implication of the relevance stage of RAM is that self-knowledge of personality may be particularly difficult in cultural contexts, such as collectivist societies, that limit opportunities for self-expression.

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HOW FORGETTING BENEFITS HEURISTIC INFERENCE

To explore how forgetting benefits memory-based inferences, we bring together two research programs with strong ecological foundations. The program on fast and frugal heuristics (Gigerenzer, Todd, & the ABC Research Group, 1999) and the ACT-R research program (Anderson & Lebiere, 1998). While many have argued that forgetting filters out obsolete information (e.g., Bjork & Bjork, 1988), we provide new specificity to this and other benefits of forgetting. Through simulation we shown that forgetting helps to maintain systematic recognition failures that are critical to the functioning of the recognition heuristic. Our simulations of the fluency heuristic, which makes judgments based on the speed with which items are recognized, show that forgetting also helps maintain the discriminability of these judgments. These results

highlight that what are often characterized as cognitive limitations, such as forgetting, may have unsuspected benefits.

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THE HINDSIGHT BIAS AS A BY-PRODUCT OF AN ADAPTIVE MEMORY MECHANISM

Once people know the outcome of an event, they tend to overestimate what could have been anticipated in foresight. Rather than thinking of this so-called hindsight bias as a flaw of human cognition, as previous research has done, we argue that it is a by-product of an adaptive mechanism, namely updating of knowledge. According to the RAFT model (Hoffrage, Hertwig, Gigerenzer, 2000, JEP:LMC), hindsight bias occurs when people attempt to reconstruct their previous judgment about an event's outcome. The idea is that any feedback or correct information they receive after they have conducted their initial analysis changes the knowledge base underlying the original judgment and causes a bias toward the new information. In the present talk, we will report two experiments that provide empirical evidence for the model. Moreover, we present simulation results, showing that knowledge updating is adaptive, as it increases the accuracy of inferences. These simulations also show that the model is able to account for well-known effects, and to make new and counterintuitive predictions. We conclude that the hindsight bias is a cheap price we have to pay for a much larger gain: a well-functioning memory that is able to forget what we do not need – such as outdated knowledge – and that constantly updates our knowledge.

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IN EXPERIENCED-BASED DECISION MAKING, MEN BEHAVE LIKE BUMBLEBEES

In a study of foraging decisions made by bees, Real (1991) observed that “bumblebees underperceive rare events and overperceive common events” (p. 985)—a pattern of probability weighting that contrasts starkly with that posited by prospect theory, the most influential descriptive account of risky choice in humans. The goal of this paper is to reconcile the apparent contradiction. To this end, a distinction between decisions from description and decisions from experience is proposed. When people have access to information sources such as newspaper weather forecasts, drug package inserts, and mutual fund brochures, all of which provide convenient descriptions of risky prospects, they can make decisions from description. When people must decide whether to back up their computer's hard drive, cross a busy street, or go out on a date, however, they typically can call only on memories of their encounters with such prospects, making decisions from experience. We find that, like bees making foraging decisions, people make decisions from experience as if they underweight the probability of rare events. We explore the impact of two possible causes of this underweighting—reliance on relatively small samples of information and overweighting of recently sampled information—and discuss the possible adaptive functions of differentially weighting the same objective probabilities.

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Female Competition (Symposium), Chair: Stacey Rucas
Audimax, Friday morning

FEMALE COMPETITION

Evolutionary studies of intrasexual competition in humans have historically focused on male-male competition. Decades of empirical research have indicated that men and boys are overwhelmingly more physically aggressive than women and girls. Recent studies by psychologists and anthropologists have begun to explore non-physical forms of aggression, contrasting traditional verbal and physical assaults with those of a more psychological and social nature. These other forms of aggression, sometimes referred to as relational, indirect, or social aggression, seem to occur more frequently among women than men, and include such behaviors as manipulating others' peer relationships, giving another the 'silent treatment,' spreading lies about another to damage their positional status, using existing social structures to harm the victim (without being personally involved in the attack), and damaging another's self-esteem or social status by influencing public opinion against them with the use of gossip, rumors, and strategically placed reputational information. Evolutionary theory predicts that social aggression results from within-community conflict over resources (broadly defined). The talks in this session will present recent anthropological and psychological evidence exploring (1) sex-differences in aggression types (2) characteristics of female hierarchies and dominance challenges (3) status competition and ally-making behaviors among women (4) the domains and social structures that differentially affect the two sexes' forms of competition (5) and finally, identification of the resources women target for competition and how they change throughout the life-course. Our main objective with this panel is to bring a better understanding through descriptive and empirical cross-cultural research on the competitive nature of women's intrasexual behaviors.

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10.20 AM

Nicole C. Hess
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*EVOLVED SEX DIFFERENCES IN AGGRESSION TYPES: INCLINATIONS TOWARDS PHYSICAL
VS. REPUTATIONAL ATTACKS*

Empirical and theoretical research suggests that reputation was an important mediator of access to valuable and monopolizable social and material resources in ancestral human environments. The manipulation of reputations by the strategic collection, analysis, and dissemination of information about the actions and capabilities of group members (i.e., gossiping) may have been one way to compete for such disputed resources. Over evolutionary time, women may have experienced more within-group competition than men, and female reputations may have been more vulnerable than male reputations to gossip. Consequently, gossiping may have been a more important competitive strategy for women than men, selecting for adaptations that might facilitate success in the competitive use of gossip. I refer to this as informational or reputational aggression. Cross-cultural recent social psychological evidence shows that women compete with other women using non-physical forms of aggression like gossip. I present results of a study showing that men more inclined to use physical aggression than women, and that women more inclined to use reputational aggression than men. Interestingly, this effect held for women even when controlling for two social influences on the use of gossip as a retaliatory behavior.

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10.40 AM

*Elizabeth Cashdan

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WHY FEMALE HIERARCHIES ARE LESS STABLE

Are males the more hierarchical sex? In a peer-ranking study of college students, I found that women and men reached similar levels of agreement in assigning peer ranks, and were equally concerned about making such distinctions. Notwithstanding these cognitive similarities, there is evidence that female hierarchies may take longer to become stable. I suggest that this discrepancy may be a consequence of sex differences in the cost of competition. A hierarchy gains stability when subordinates acknowledge and defer to the dominance of others; agreement about rank placement is not sufficient. Where the costs of conflict are lower, as they are likely to be among women, the benefits of respecting rank are reduced. I use competition diaries to evaluate this argument by testing the prediction that competitive interactions will be less likely to reach resolution when they are expressed non-aggressively. If supported, this argument suggests that female hierarchies may be less stable not because women are less competitive, or less aware of rank, but because their style of competition makes them less willing to defer to the dominance of others.

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11.00 AM

Joyce Benenson

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FEMALE COMPETITION- DIFFERENT STRATEGIES AND TARGETS

Classic evolutionary biology assumes that human beings follow the general pattern of most mammalian species in which males are more competitive than females. My research suggests that human females are just as competitive as males, though the domains in which they compete and their targets differ. Physical toughness, the primary domain of males' competition, is less important for females who compete more over beauty, same-sex friendships, and mating partners. What is critical to consider however is that females are more likely than males to focus on individuals, whereas males are more likely to embed their relationships within groups. This promotes different types of competition. In particular, males may compete at first with one another, then accept differential status rankings within a larger group. By contrast, females demand equality with their closest same-sex friends who remain separate from a group. Sex differences in agreement on status rankings then may reflect varying forms of social structure rather than the importance of competition. Finally, the extent to which females in the ancestral past interacted frequently with unrelated same-sex peers is worth questioning. Whereas interaction with unrelated peers seems to characterize males' interactions across diverse societies, females generally spend more time with kin. Thus, for females, extended competition with unrelated individuals may be quite novel in terms of evolutionary history. An accurate model of competition between unrelated females will require utilizing completely different benchmarks than those currently applicable to competition amongst males.

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11.20 AM

Andrea Evans

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STATUS AND ALLIANCES: FEMALE ALLY-MAKING BEHAVIOR

Human hierarchies differ from other nonhuman primate hierarchies in several important ways; the most important being human's reliance on coalitional formation. Human hierarchy formation is closely linked with alliance formation between individuals in order to increase status within the hierarchy. In fact,

alliance formation is vital to the development and maintenance of status for both male and female humans. Human females are expected to desire individual status and possess alliance-building adaptations; thus, human females should be expected to spend time forming allies with other adults. I hypothesize that human females will form alliances with both males and females, perhaps with a preference for male allies. Some evidence supports this idea, yet empirical data will be used to clarify these questions. Additionally, I explore evidence suggesting that status within the hierarchy can affect ally-making behavior between individuals. Evidence from nonhuman primate studies suggests that those in the middle of the hierarchy spend more time forming and maintaining allies than low and high status individuals. Mid status individuals have much to gain from increasing status and are able to attract coalitional partners; thus, alliance formation for mid status individuals is highly beneficial and less costly, making it a sound behavioral option. To tackle these questions, I analyzed data collected among the Tsimane people living in Bolivia. Data from this sample show that females spend more time with other adult females. In addition, the data suggest that adult females with mid range status spend more time forming bonds with other adults.

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11.40 AM

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LIFE HISTORY CHANGES IN RESOURCE COMPETITION AMONG TSIMANE WOMEN AND GIRLS

Since resources are the limiting factor in female reproductive success, female-female competition is expected to follow the path of contestation over those resources which impact the quantity and quality of offspring. And, while food and mates are often credited as being the particular resources of interest in humans, due to the social nature of human groups and the importance of social networks to women, I predicted that they would also target friendships, good cooperative partners, and other material goods. Because of the changing effects of reproductive value and dependent children, women are also expected to vary in the type and quantity of resources needed throughout the life course. In this study, I interviewed 121 Tsimane women and girls living in lowland Bolivia regarding their disagreements with other women in their communities. Data presented on quarrels (n=335) demonstrates that the resources targeted in female-female competition encompass a number of different categories and that a life-history model of trade-offs to investment in reproduction at varying ages predicts changes in the types of resources contested by women and girls.

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Philosophical Critics (Symposium), Chair: Edouard Machery
Lecture Hall A, Friday morning

EVOLUTIONARY PSYCHOLOGY AND ITS PHILOSOPHICAL CRITICS

In many respects, evolutionary psychology can be viewed as the most recent paradigm shift in psychology. Evolutionary psychology promises new methods to deal with the traditional research topics in psychology, based on the evolutionary/adaptationist methods used in evolutionary biology, and offers new research questions as well, particularly the adaptative function of our cognitive competences. Evolutionary psychologists themselves have often underscored the revolutionary aspects of their approach (e.g., Tooby and Cosmides 1992).

This paradigm shift has not been unnoticed by philosophers of psychology and biology. On the contrary, philosophers have examined, often in a critical way, the methodological and theoretical commitments of evolutionary psychology. The role of the adaptationist reasoning, the capacity to infer the structure of our cognition from past environment, the evolved modularity of the human mind, the importance of culture in human cognition, the notion of innateness have been particularly scrutinized by philosophers.

However, philosophers' criticisms, even the most constructive ones, have had very little impact on the practice and theoretical tenets of evolutionary psychologists. Moreover, evolutionary psychologists have not addressed the worries that were put forward by philosophers. The goal of this symposium is to end up this unfortunate state of affairs. The symposium will bring together philosophers of psychology and biology, who have been working, in a critical way, on the tenets of evolutionary psychology. An evolutionary psychologist, Clark Barrett (UCLA, anthropology), will reply to their papers. We hope thereby to bridge the gap between evolutionary psychology and its philosophical critics.

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10.20 AM

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EVOLUTION AND LEARNING

I argue that evolutionary psychology has failed to address seriously the question of how humans acquire ontogenetically their cognitive competences. Since it was modeled on the evolutionary biology of the sixties and seventies, evolutionary psychology did not purport to develop theories of cognitive development and of learning. This is also true of human behavioral ecology. In the eighties and nineties, ontogenetic development has however been under scrutiny in evolutionary biology. I suggest that this research tradition should lead evolutionary psychologists to broaden the scope of the evolutionary study of human behavior and cognition: evolutionary theories of learning and of cognitive development may be the next step in evolutionary psychology. I present and criticize the main views of human development that have been put forward by evolutionary psychologists. I discuss the ideas developed by the gene-culture coevolution tradition. On the basis of the recent evolutionary study of development, I try to characterize some questions that may be fruitfully addressed by evolutionary theories of learning and cognitive development.

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10.40 AM

Richard Samuels
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MASSIVE MODULARITY AND THE PROBLEM OF FLEXIBILITY

Critics of evolutionary psychology are fond of claiming that cognitive flexibility poses a serious problem for massively modular theories of our mental architecture. Yet it is seldom explained with any clarity what cognitive flexibility is or why it constitutes such a serious problem. In this talk I identify a range of different versions of the flexibility problem and assess some recent responses from advocates of massive modularity. I argue that these proposals are unsatisfactory and suggest that attempts to explain cognitive flexibility without positing non-modular systems are both unmotivated and unlikely to succeed.

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11.00 AM

*John Dupre
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WHY EVOLUTION TELLS US SO LITTLE ABOUT HUMAN NATURE

Evolutionary psychologists have imagined that reflection on the conditions of early human existence can provide insight into contemporary human nature. As I shall explain in this talk, sophisticated contemporary understandings of evolution and recent advances in genomics both contribute to scepticism about the view of evolution on which this argument is based.

Development systems theory has shown that the traditional picture of evolution as the accumulation of better adapted genes is inadequate, and that much besides genetic material can be inherited as a developmental resource. This undermines the crucial evolutionary psychologists' argument for atavism: that the glacial pace of evolution necessitates the adaptation of human nature to the conditions of the distant past.

Insights emerging from genomics reinforce this conclusion. As the complexity of genomic interactions and the ability of cells to make diverse products from a surprisingly small set of coding sequences becomes clear, it becomes increasingly untenable to see the gradual accumulation of mutations as the sole driving force of evolution. Rather, various more or less global reorganisations of the genome seem plausibly more important. This further undermines the location of the origins of universal human nature in the Pleistocene even for those who insist on locating evolutionary change entirely in the genome. It becomes possible to propose major recent developments in, and diverse variants of, human nature.

Finally, none of these arguments denies that human behavioural dispositions evolved. The target is only a regrettably influential account of that evolution.

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11.20 AM

Pierre Poirie, *Luc Faucher, Jean Lachapelle
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THE CONCEPT OF INNATENESS AND THE DESTINY OF EVOLUTIONARY PSYCHOLOGY

An evolutionary attitude is gaining momentum in the cognitive sciences and it now seems almost certain that it will leave its mark on the field just like the cyberneticists' and computer scientists' "information processing" attitude left its mark a generation or so ago. Although the attitude covers a vast and eclectic domain, an influential group of researchers recently monopolized the expression "evolutionary psychology" to describe a form of psychology defined by the three following theses:

1. (Massive) Modularity of Mind: The human cognitive architecture is mainly made up of information processing computational modules.
2. Adaptationism: The human cognitive architecture is a product of natural selection.
3. Innateness: The human cognitive architecture is the phenotypic expression of the human genetic heritage, which is, more or less, shared by all humans.

In short, the mind is a massive aggregate of autonomous innate computational devices, each adapted to solve specific adaptive problems. Due to its importance and somewhat orthodox character, we shall call this version of the evolutionary attitude Good Old-Fashioned Evolutionary Psychology or GOFEP. Our aim is to show that GOFEP, although it does not suffer from fatal flaws that would make it an incoherent version of the attitude, will nevertheless prove unacceptable to most cognitive scientists today. As the title suggests, much of the blame for this can be put on the concept of innateness as it is used by GOFEPs. Our object is to spell out this story.

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Is Depression an Adaptation, Chair: Ed H. Hagen
Lecture Hall B, Friday morning

10.20 AM

Frank Pillmann

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*HOW DEPRESSED AFFECT MODULATES SELF-REPORTED ACTION TENDENCIES –
RESULTS OF A PILOT STUDY*

Background: Evolutionary theories of emotions have suggested a variety of functions for depressed affect (e.g. solicitation of help, focussing on salient problems, avoiding of competitive conflicts). We report about the validation of the Mood and Behaviour Questionnaire, a newly developed questionnaire for the assessment of self-reported action tendencies (help-seeking, problem-oriented, risk-taking, competitive and hedonic behaviours). Methods: 175 mentally healthy subjects and 94 psychiatric patients of different diagnoses completed the Mood and Behaviour Questionnaire, the Beck Depression Inventory, and the Profiles of Mood States. Results: The Mood and Behaviour Questionnaire reliably discriminated between different categories of action tendencies. Highly differential and significant relationships between emotional states and action tendencies became obvious both in the total sample and in depressed and non-depressed subsamples. E.g., help-seeking behaviour correlated negatively with all negative emotions, problem-oriented behaviour correlated positively with low mood only in the non-depressed sample, and competitive behaviour correlated negatively with depression and low mood. Conclusions The measurement of action tendencies by a self-report measure is feasible. Some of the results support a special role of depressed mood in the regulation of competitive behaviour and may serve as a starting point for further investigations.

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10.40 AM

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SUICIDALITY AS A BARGAINING STRATEGY

An individual suffering opportunity costs often needed other group members to make changes in social contracts to alleviate those costs. When there were conflicts of interest between the individual and group members, however, group members may have been disinclined to make the necessary changes. Because humans evolved in small, interdependent communities where the goods and services provided by individuals were not easily replaced, an individual could compel changes to social contracts by threatening to withhold the benefits they provided the group until the desired changes were forthcoming. In other words, relatively powerless individuals could bargain. Major depression (MD) has been proposed to be just such a bargaining strategy (Hagen 1999, 2002, 2003; Watson and Andrews 2002). Suicidality, an important symptom of MD, is a threat to permanently eliminate oneself as a valuable source of benefits. Unlike other depressive symptoms, suicidal threats are easily and effectively broadcast to group members. Suicidal attempts would occasionally be required to make those threats credible; suicide completions would be the unfortunate outcome of increasingly serious suicide attempts when the desired changes were not forthcoming from group members.

Unlike MD, suicidal threats and attempts are relatively easy for anthropologists conducting routine ethnographic fieldwork to observe. Consequently, in contrast to MD, there are numerous ethnographic accounts of suicidality in small-scale societies. These accounts make clear that suicidality is often used by relatively powerless individuals to redress perceived wrongs committed by group members, supporting the bargaining model of suicidality and MD.

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11.00 AM

*Stefanie L. Turner, Francis T. McAndrew
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A LABORATORY SIMULATION OF HAGEN'S DEFECTION HYPOTHESIS: DETERMINING THE ROLE OF FUTURE REPRODUCTIVE OPPORTUNITY AND OFFSPRING QUALITY IN PARENTAL INVESTMENT

Hagen (2002) proposed that postpartum depression evolved as a mechanism for mediating investment in newborns, with the willingness to invest being determined by the mother's age and the quality of her offspring. We tested this hypothesis by simulating the postpartum situation in college students engaged in racing hamsters. Each of 113 subjects (40M, 73F) received a hamster ("offspring") and several poker chips ("resources") and was then asked to decide how many resources to invest into the hamster based on information about the quality of the offspring (was the hamster trained or untrained?) and about the possibility of investing in other hamsters in future races. Subjects invested the most in low quality offspring when they were only going to have one investment opportunity, and they invested the least in low quality offspring when there would be more investment opportunities in the future. Investment in high quality offspring was relatively unaffected by the presence or absence of future investment opportunities. A significant interaction also indicated that males and females made different investment decisions, depending upon the quality of the offspring. Overall, the results were supportive of Hagen's Defection Hypothesis.

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11.20 AM

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"SADDER BUT FITTER". THE EVOLUTIONARY FUNCTION OF DEPRESSIVE SYMPTOMS FOLLOWING FETAL LOSS

According to the presented model depression following miscarriage or stillbirth is an evolutionary protective mechanism to avoid further fetal loss. The model postulates that these depressive symptoms delay the next attempt to reproduce and that this is an adaptation to causes of fetal loss (epidemics, famines, infections, environmental toxins). In further detail we postulate, that the symptoms of this depression have three adaptive functions: delay of subsequent pregnancies, protection of resources and search for causes. These reactions are thought to reduce the probability of further fetal losses. For the examination of the model, the following areas from literature not previously used in this context are discussed: (1) fetal loss as a trigger of depression, (2) the influence of depression on pregnancy delays and (3) the effect of these delays on following reproduction attempts.

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11.40 AM

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CAPTAIN ROBERT FITZROY'S DARWINIAN DEPRESSION

Robert FitzRoy made Charles Darwin. "The voyage of the Beagle has been by far the most important event in my life, and has determined my whole career.....I have always felt that I owe to the voyage the

first real training or education of my mind,” wrote Darwin in his autobiography. FitzRoy’s place in history remains forever that of the man who sailed Darwin around the world and provided the crucial natural laboratory for his ideas. Remembered as imperious and difficult, Robert FitzRoy also suffered from depression and took his own life at age fifty-nine. One of his depressions, in the fall of 1834 during the Beagle’s voyage, illustrates the possibility that Major Depressive Disorder (MDD) may be a social adaptation designed to help otherwise powerless individuals to influence their social group. Though it appears to be all cost and no benefit, we propose that MDD is actually a psychological adaptation engineered by natural selection to help individuals resolve complex, socially-imposed stresses that could affect long-term fitness by convincingly signaling need and compelling help from reluctant others. In short, we hypothesize that MDD’s debilitating symptoms - its “costs” - elicit compensating benefits. The case history of Captain Robert FitzRoy illustrates the hypothesis.

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12.00 PM

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PERSONALITY, MOOD, AND DOMAINS OF RISK-TAKING

In two studies we evaluate the evolutionary hypothesis that low positive affect is associated with an adaptive reduction in the propensity to undertake social risks. First, 154 psychology students were administered questionnaires assessing five personality factors, mood and self-esteem, and a measure identifying one’s propensity to undertake financial, accident-related, health-related and social risks (the RSQ). After controlling for individual differences, low positive affect was significantly related to a reduction in social risk taking alone. In Study Two, 78 students were divided into two groups and successfully administered one of two musical mood inductions (depressed vs. neutral), followed by the RSQ. While the induction failed to produce between-group differences in participants’ risk-taking propensities, after controlling for mood, high initial positive affect was significantly associated with increased social risk-taking, thereby replicating Study One. Taken together, results provide preliminary support for the proposition that depression reduces social risk taking.

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Mate Preferences II, Chair: Karl Grammer
Lecture Hall C, Friday morning

10.20 AM

*Andrew Clark
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CUES OF RECEPTIVITY INFLUENCE JUDGEMENTS OF ATTRACTIVENESS

If sexual attraction functions to facilitate adaptive allocations of mating effort, males should be attracted to fecund females with good genes but it also makes sense for males to be attracted to females who exhibit cues that indicate a high probable rate of return for mating effort. Therefore, cues of receptivity are expected to influence male judgements of female attractiveness. In addition, the direction of these cues may modify this effect; cues directed at another male may not reliably indicate what type of cues will be directed to the observer or may suggest the level of intersexual competition associated with a potential mate. I tested these hypotheses using video stimuli. The stimuli were composed of two interviews for each of four actresses (8 interviews in total). One interview was recorded while the actress was acting proceptively and the other while the actress was acting unreceptively. Each interview was presented as either being directed toward the subject or directed at a male interviewer. Therefore, there were four

conditions for each actress. Each subject saw each actress once and each condition once and was asked to rate each actress for attractiveness. Using a repeated measures ANOVA, I found that there was a significant main effect of receptive state and a significant interaction between receptive state and signal direction. Although it is clear that proceptivity enhanced attractiveness, the pattern of the interaction varied between the actresses and may be related to non-behavioral aspects of each actress's attractiveness.

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10.40 AM

*Craig Roberts, Morris Gosling, Marion Petrie
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REVISITING MHC PREFERENCES AND EFFECTS OF ORAL CONTRACEPTION

Several studies have reported associations between pleasantness of human odour and genotype at the major histocompatibility complex (MHC). Some studies also report disruptive influences on adaptive odour and facial preferences caused by the contraceptive pill. Results have so far been correlational, comparing preferences of pill users with non-users. Here we present results of experiments where we test effects of the pill more directly by measuring preferences of the same women before and after initiating use of oral contraception. Women were asked to judge attractiveness of both male odours and faces. Changes in preferences in women initiating pill use are compared with a control group of women who were tested twice but who did not use the pill. The results question the view that oral contraceptives have a pervasive influence on adaptive mate preferences.

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11.00 AM

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DANCE TO YOUR OWN BEAT: THE COMMUNICATION OF PERSONALITY AND HONEST SIGNALING

At zero acquaintance strangers can assess each others personality after short times of interaction, and it has been shown repeatedly that these judgments are valid and accurate. It is unknown what behavior correlates carry the information the receiver uses in order to make his/her evaluations. In evolutionary terms one of the functions of personality is the self presentation as a reliable social resource. If this is the case there is also the possibility of deception and therefor communication of personality should manifest itself in honest signals. Recent research suggests that the quality of body motion may be such a signal. We hypothesize that sex-specific personality features are communicated which play a role in mate selection and cooperation.

In order to analyze this, we videotaped 340 subjects during dancing while observed by same sex or opposite sex observers. The subjects then filled out a personality questionnaire (NEO-FFI short version). Body motions were analyzed automatically by digital image analysis for motion energy detection.

The result show that there is the predicted relation between personality traits and changes in the quality of body motion but only when an opposite sex observer is present.

We hypothesize that these changes are produced actively and that they are costly for the sender and thus are handicap signals. We will introduce a new communication theory where we propose that personality is not assessed by the learning of social stereotypes, instead we suggest the possibility of real time simulation of personality by the receiver.

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11.20 AM

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EVIDENCE FOR HUMOR AS A SEXUALLY-SELECTED TRAIT

It has been argued that humor is a sexually-selected trait that indicates individuals' mate quality. Since errors in mate choice are more costly for women than for men (due to women's greater obligatory parental investment), we predict that women's mate choice will be more influenced by the presence of humor than men's mate choice. In our first study, we investigated this hypothesis by experimentally manipulating how funny target individuals appeared to be. We then measured men's and women's perception of the target individuals' desirability as relationship partners. We found that women rated humorous men as more desirable than men who did not use humor, but that men did not rate humorous women more desirable than women who did not use humor. In our second study, we investigated whether men and women have divergent preferences for different behaviors that are related to humorous interaction. We asked men and women to choose which of two individuals was more attractive: an individual who displayed high-quality humor, or an individual who was receptive to one's own humor. Women preferred individuals who produced high-quality humor, while men preferred individuals who appreciated their own humor. We interpret these findings in terms of sexual selection theory.

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11.40 AM

Mark J. T. Sergeant (NYI)
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OLFACTION AND FEMALE MATE CHOICE

Olfactory cues play an important role in human mate selection practices. This study addressed a conflict over the nature of sex differences in this importance (Herz & Cahill, 1997; Herz & Inzlicht, 2002). 151 males and 443 females completed an on-line version of the Romantic Interests Survey (RIS) a psychometric tool designed to evaluate the relative importance of social and physical characteristics during mate selection. Results indicate olfaction is important during mate selection, but that sex differences are non-significant. This finding suggests males and females may display preferences for different forms of olfactory cue, relating to differential reproductive strategies. Further research is suggested to establish if there are sex differences in the role of unconsciously perceived odours in mate selection. The observed sex difference in preferences suggest males value signs of reproductive capacity (signs of fertility and reproductive value), and females value signs of resource acquisition (signs of health, resources, and status).

Additionally there was a significant difference obtained concerning the type of odour source that individuals attend to. Greater preferences were observed in connection to a potential mate's natural body odour as opposed to the artificial fragrances they use. As body odour can communicate a variety of biologically relevant information, this finding is significant for our understanding of the role olfaction plays in mate selection.

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12.00 AM

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HUMAN MALES USE OLFACTORY CUES TO DETECT OVULATION

Unlike many non-human primate species, human females do not produce conspicuous sexual swellings around the time of ovulation. The lack of any such obvious visual cues, combined with the assumption that olfaction does not play a significant role in the biology of humans, has underpinned the long held belief that ovulation in human females is concealed. However, recently there has been some suggestion that odour might play a larger role in human sexual and social biology than previously thought. A number of studies have shown that females can discriminate between males on the basis of odour, and here we show that males can discriminate female sexual states using olfactory cues alone, and that their ability to do so must be linked to oestrogen or its by-products.

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Signals and Sentiments (Symposium), Chair: Tim Ketelaar
Lecture Hall D, Friday morning

SIGNALS AND SENTIMENTS: EVOLUTIONARY INSIGHTS INTO EMOTION AND BEHAVIORAL ECONOMICS

Theorizing about the role of emotions in strategic decision-making has traditionally focused on two putative mechanisms of emotional influence on behavior: Sentiments and Signals. The view that emotions are sentiments assumes that emotions operate as strategic mental states that alter perceptions of the subjective payoffs assigned to particular courses of action (Tooby & Cosmides, 1990; Nesse, 1990; Ketelaar & Todd, 2000). The view that emotions are signals, on the other hand, assumes that emotions operate as mechanisms for conveying threats and promises capable of supporting contracts and norms (Hirschleifer, 1987, 2001; Frank, 1988; Nesse, 2001). The current symposium brings together several lines of empirical research that treat emotions as signals and/or sentiments underlying behavior in social bargaining situations such as trust games, ultimatum games and the iterated Prisoner's Dilemma. This research suggests that integrating the "fuzzy" concept of emotion into the concrete framework of experimental economics has great potential for illuminating several puzzling forms of human cooperation, including sharing in anonymous, one-shot interactions and apparently altruistic acts of punishment directed towards individuals who violate social norms.

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10.20 AM

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EMOTIONS AS SIGNALS AND SENTIMENTS: A BRIEF HISTORY AND SOME RECENT EMPIRICAL EVIDENCE

This talk provides a brief overview of the history of theorizing regarding emotions and strategic decision-making. By reviewing ideas that span from Adam Smith to Robert Trivers/Randy Nesse and from John von Neumann to Jack Hirschleifer/Robert Frank, I illustrate how emotions have traditionally been conceptualized as sentiments and/or signals. I argue that the emotions-as-sentiments view has been championed as a plausible mechanism for explaining subjective commitments to strategies that run counter to one's immediate self-interest (Nesse, 2001); yet this perspective has also been criticized as being empirically intractable (e.g., how do you actually measure unobservable, internal, moral sentiments)? By contrast, the emotions-as-signals view has been championed as a plausible means of coordinating symbiotic strategy types and communicating information about reputation and norms (Frank, 1988; Hirschleifer, 1987, 2001). However, this emotions-as-signals view has also been criticized as problematic (e.g., If such signals are cheap to produce, how can they be credible?). To illustrate these two views of emotion—sentiments and signals—I review recent empirical findings regarding the role of

emotional feeling states in representing the utilities associated with outcomes as well some recent data on emotional signaling in poker games.

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FEELING IS FOR DOING: A PRAGMATIC APPROACH TO THE STUDY OF EMOTIONS IN ECONOMIC BEHAVIOR

Research on the role of emotion in decision making has focused mainly on the valence aspect of emotions. That is, it has limited itself to whether emotions are positive or negative. The core idea in my presentation is that different emotions with the same valence may differentially impact behavioral decisions. Hence, when studying the impact of emotions on decision making one needs to go beyond valence and look at emotion specific aspects.

The big idea is that “feeling is for doing.” I mean that when one considers the potential impact of emotion on behavior, one should take seriously the fact that people may experience a whole range of different emotions, each with its idiosyncratic experiences. I argue that this variety of feeling states exists for the sake of behavioral guidance. The specific emotion felt in a situation indicates a particular problem and prioritizes behavior that deals with this problem. Because different problems require different solutions, different emotions produce different behaviors. For example, when one is fearful, running away from the fear-evoking stimulus has priority. But when angry, one is inclined to move toward the source of the anger. If one ignores emotion-specificity, one would predict similar effects for anger and fear, because both emotions have a negative valence. A specific emotions approach predicts differential effects for fear and anger. I will demonstrate this line of reasoning with examples of our own research on specific emotions and economic behaviors.

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11.00 AM

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THIRD-PARTY PUNISHMENT: PUNITIVE SENTIMENT OR REPUTATION?

Humans engage in “third party punishment,” inflicting costs on those who have violated a social contract or social norm, even though the costs are inflicted on another, rather than the self. The ultimate explanation for and proximate mechanisms that underpin this behavior remains the subject of debate. We conducted an experiment in which 12 participants played a set of extensive form “trust games,” which allowed us to elicit a range of trustworthy and untrustworthy behavior. Subsequently 45 new participants were given the opportunity to pay between \$0 and \$7 to punish (decrease the payment of) an individual who was untrustworthy in the trust game. Participants were assigned to one of two conditions: either an “anonymous” condition in which neither the experimenter nor the participants were made aware of how much the participants punished the untrustworthy other, or an “observed” condition in which all participants were required to show the experimenter how much they chose to punish. Participants in the anonymous condition punished very little, less than \$1. Participants in the observed condition punished at significantly higher levels than individuals in the anonymous condition. This argues against models that imply third-party punishment is driven by preferences such as inequity aversion, internalized norms, or punitive sentiment, but supports reputation-based models. In turn, reputation-based models imply individual selection rather than group selection as the ultimate explanation for the psychology of third-party punishment.

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FOOLISH SLAVES OR WISE MASTERS: THE RELATIONSHIP BETWEEN SOCIAL EMOTIONS AND COOPERATIVE BEHAVIOR

Research in experimental economics indicates that people frequently cooperate and punish even when doing so appears contrary to their economic interests, and data from various settings suggests that emotions may play an important role in such behaviors. However, much about the role of emotions in social behavior is still uncertain. Evolutionary psychologists have discussed the overall nature and function of emotions mostly at a theoretical level. Empirical work in social psychology and economics has begun to recognize the importance of emotions in decision-making processes, but has largely been descriptive, with little emphasis on ultimate explanations. Little work has brought these perspectives together to systematically examine how specific emotions affect decision-making processes in the context of particular social interactions—especially in the context of cooperative behavior. Integrating these perspectives, this talk will briefly present a cognitive model of emotions in decision making, while presenting results from a series of behavioral economics experiments designed to examine the effects of different emotions on economic-game behavior. Emotion-induction tasks were used to manipulate several different emotion states in the context of one-shot anonymous ultimatum and trust games. Results reveal the specific effects of various emotions, and generally demonstrate that factors unrelated to the structure of the game can significantly affect the decision-making processes of players. These results have implications for how we think about human emotions, their role in decision making in social interactions, and how best to interpret results from experimental investigations of altruistic and cooperative behavior.

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Determinants of Norms of Cooperation (Symposium), Chair: Simon Gächter
Audimax, Friday afternoon

INSTITUTIONAL AND SOCIAL DETERMINANTS OF NORMS OF COOPERATION AND PUNISHMENT

Social groups and even whole societies may strongly differ in the attitudes toward cooperators and free riders. Norms of cooperation may extend beyond one's own social group and shape institutional features of social interactions. Social groups with different social backgrounds may also differ in their willingness to punish free loaders and how they react to punishment. The four papers in this symposium study address these issues.

Jeffrey Carpenter studies a phenomenon he calls "social reciprocity". He defines social reciprocity as the act of demonstrating one's disapproval, at some personal cost, for the violation of a widely-held norm (for example, don't free ride). Social reciprocity differs from reciprocity because social reciprocators punish all norm violators, regardless of group affiliation or whether or not the punisher bears the costs. In an experiment he finds that most subjects who punish do so to discipline transgressors and helping others is largely a positive externality. Finally, to provide some theoretical foundations for social reciprocity, he shows that generalized punishment norms survive in one of the two stable equilibria of an evolutionary public goods game with selection drift.

Carpenter – in line with most previous studies – only models punishment as a norm enforcement mechanism. Yet, social groups may also use reward mechanisms to enforce desired behavior. Bernd Irlenbusch studies the sanctioning mechanisms that evolve endogenously in social groups if people can use both rewards and punishments or neither of the two. It turns out that initially people don't use punishments very often but over time punishment turns out to become the predominant mechanism for norm enforcement. Punishment turns out to be the most preferred and the most effective norm enforcement mechanism: in the last rounds contribution rates are almost 100%.

While the first two papers use students as their experimental subjects, the final two papers study cooperation and punishment in non-student subject pools. Understanding non-student subject pools is important to learn about how general and robust laboratory findings are. The methodology of both papers is to look at social groups with very special backgrounds.

Benedikt Herrmann investigates urban and rural dwellers in Russia. These subject pools are interesting because most people were socialized in the collectivist past of the Soviet-Union. He finds patterns in

punishments that differ markedly from those observed in most previous experiments. Many people punish across the board and – in stark contrast to previous evidence – cooperation rates are not affected by the presence of punishment opportunities.

Michael Kosfeld studies cooperation among antisocial personality-disordered criminals. Studying antisocial people provides a highly interesting benchmark case. He finds that – compared to a student control group – the criminals don't discriminate between co-operators and free riders when they punish and their cooperation behaviour is also not affected by punishment.

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1.30 PM

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SOCIAL RECIPROCITY

We define social reciprocity as the act of demonstrating one's disapproval, at some personal cost, for the violation of widely-held norms (e.g., don't free ride). Social reciprocity differs from standard notions of reciprocity because social reciprocators intervene whenever a norm is violated and do not condition intervention on potential future payoffs, revenge, or altruism. Instead, we posit that social reciprocity is a triggered normative response. Our experiment confirms the existence of social reciprocity and demonstrates that more socially efficient outcomes arise when reciprocity can be expressed socially. To provide theoretical foundations for social reciprocity, we show that generalized punishment norms survive in one of the two stable equilibria of an evolutionary game with selection drift.

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1.50 PM

Özgür Güerker, *Bernd Irlenbusch, Bettina Rockenbach
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ENDOGENOUS INSTITUTION SELECTION IN PUBLIC GOODS

Different social groups may employ various predetermined institutional mechanisms to guarantee the provision of public goods, e.g. punishment or rewards. In general, however, individuals are free to choose the social group they want to join. In this study we experimentally investigate the endogenous selection of different co-existing institutions, i.e. individuals may voluntarily enter a world with "punishment", "reward", or no mechanism at all. Surprisingly, subjects stay away from the punishment world in the beginning but over rounds this mechanism turns out to be the most preferred and the most effective one: in the last rounds contribution rates are almost 100%.

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NORMS OF COOPERATION AMONG URBAN AND RURAL DWELLERS: EXPERIMENTAL EVIDENCE FROM RUSSIA

We investigate norms of cooperation by conducting public good experiments with and without punishment among student and non-student urban and rural dwellers in Russia. There are strong differences between

the generations: Our non-students were socialized in the collectivistic former Soviet Union; and our student subjects experienced their formative years in the transformation period of the post- Soviet era. A second dimension is the still-substantial gap between urban and rural areas in Russia. In the absence of punishment we find strong differences between subject pools in cooperation rates, but in the presence of punishment differences between subject pools vanish. Punishment does not affect significantly affect cooperation rates – a finding which is in stark contrast to most of the existing evidence. Punishment is strongly different between subject pools and reflects a couple of interesting social interaction effects.

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2.30 PM

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COOPERATION AND PUNISHMENT WITH ANTISOCIAL PERSONALITY DISORDERED CRIMINALS

We analyze the behavior of male, antisocial personality disordered criminals in a public-goods experiment with punishment. In the experiment each subject interacted via the internet with three other subjects, who were students recruited at the University of Zurich. Interaction was anonymous and involved real monetary stakes. A group of non-criminal, male subjects served as a control group. Our main findings are: (i) punishment by other group members has a weaker effect on the cooperation level of antisocial personality disordered subjects compared with the control group and (ii) the pattern of punishment by antisocial personality disordered criminals fundamentally differs from the punishment pattern of the control subjects. While the latter mostly involves the punishment of a defector by a cooperator, the punishment by antisocial personality disordered subjects is basically independent of the punished subject's contribution to the public good.

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Mutual Mate Preference (Symposium), Chair: Peter M. Todd Lecture Hall A, Friday afternoon

STUDYING THE INTERACTIONS OF MUTUAL MATE PREFERENCES

An individual's mate preferences do not operate in a vacuum, single-handedly specifying what kind of mate the person will end up with. Rather they interact with the mate preferences of potential partners to jointly determine what pairs of people will be mutually acceptable to each other. This symposium focuses on these interactions between male and female mate preferences and on new ways to study their impact on mate choice outcomes. Todd begins by introducing a dataset gathered in a commercial speed-dating context, in which over 40 men and women came together in one evening and spent 5 minutes talking to each other in all possible male-female pairs, after which each person decided if they would like to meet the other for a date in the future. Using pre- and post-event questionnaire data on participants' relevant attributes and mate preferences along with the actual "mate" (dating) choices they made at the event, Todd shows that mutual mate choices reflect a different set of preferences from what individuals initially state regarding their preferred mates. Lenton uses this dataset to show which men and women both received more dating offers and made more offers, as well as how the two fit together to result in matches (mutually agreed-upon dates) at the end of the event. Fasolo compares data from multiple speed-dating events with an online-dating study to argue that having more potential mates to choose from, rather than increasing the interactions of mutual mate preferences to yield more proposed dates and matched couples, can actually decrease the number of choices made, a finding related to recent concerns about consumer choice-overload. Finally, Wilke uses a different technique to explore the use of risky behaviour as a cue in mate choice by men and women, demonstrating that women assess men's risk-taking in particular domains as an attractive signal and that men know just how women do this. Furthermore, men

and women seem to pair up assortatively in terms of risk-taking, showing another potential outcome of mutual mate preferences.

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TESTING PATTERNS OF MATE PREFERENCES VIA ACTUAL CHOICES

Much of the research on human mate preferences is built on asking people what kinds of mates they prefer and what features they value. Recently for instance Buston and Emlen asked nearly 2000 undergraduates what traits they valued in a mate, and what traits they themselves embodied. Using this data, Buston and Emlen argued that men and women prefer similar partners, rather than men and women trading different attributes—e.g. status and attractiveness, respectively—for their prospective mates, as predicted by many evolutionary psychologists. But people of course often do not say what they actually do. To counter the problems of self-reports in this domain, we ran a study using a commercial speed-dating event to compare participants' reported preferences against the people they actually chose to date. Analyses replicated Buston and Emlen's "likes-attract" effect for stated preferences, but differed dramatically in the direction of evolutionary predictions when actual choices were considered.

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THE (MATE) VALUE OF FASTDATING

FastDating provides a ripe opportunity to examine issues of concern to those studying evolutionary-based processes in mate choice. In this paper we describe the results of an investigation of the relationships between a participant's mate value (physical attractiveness + income + socio-status + BMI) and: a) The number of offers s/he makes; b) The number of offers s/he receives; and c) The number of matches s/he obtains. In brief, results show that the number of *offers received* is, by and large, predicted by the recipient's mate value. In particular, those with a higher mate value receive more offers. A more detailed analysis reveals that it is her/his physical attractiveness – a visual cue – that provides the biggest contribution to this finding. Participants' gender also predicts the number of offers received such that women receive more offers than men. The number of *offers made* is predicted by the mate value of the individual making the offer, such that those with higher mate value make fewer offers. Further analysis reveals that it is more attractive and wealthier participants who make fewer offers. Gender also predicts number of offers, with men making more offers than women. And finally, the number of *matches obtained* does not depend on overall mate value nor on gender, though attractive participants obtain more matches than do unattractive participants. Results will be discussed with reference to evolutionary theories of sexual strategies and ecologically rational heuristics.

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'SHOPPING' FOR A MATE: IS LESS MORE?

When shopping for goods, consumers value variety and wealth of choice. Recent research suggests, however, that increased choice does not necessarily bring satisfaction with the choice process or the option selected. We investigate whether the same 'less is more effect' persists when searching for a mate in two particularly modern mate search contexts: WebDating and FastDating. Participants in our WebDating experiment chose 1 out of either 4 or 20 potential partners. Support for the 'less is more effect' was found: Although participants choosing among 20 potential mates perceived more variety, they were less satisfied with the choice process and were no more satisfied with their ultimate selection. It appears participants in the 20-option condition experienced 'information overload,' as they wished to see fewer than 20 profiles and less information per profile. In the context of FastDating, one would assume that a larger pool of participants increases the chances of finding a match. We find this not to be the case however: number of potential mates was not related to matches obtained. If the goal of FastDating is to obtain matches, there seems to be no added advantage to participating in larger sessions (especially given that searching through a larger set of options requires relatively more time and cognitive resources). It would thus seem that - like the consumer context - less may indeed be more, even when shopping for a mate.

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RISK-TAKING BEHAVIOR AS A CUE IN MATE CHOICE: A CROSS-CULTURAL STUDY

Human risk-taking shows strong sex differences, suggesting risk-taking may be sexually selected. We tested whether risk-taking behavior can be used as a cue in mate choice by studying both individual preferences and matching in couples. First, we investigated whether young, heterosexual women use risk-taking as a cue for mate choice. Measured with a domain-specific risk inventory, women reported finding male risk-taking in recreational and social domains attractive as it could act as a cue for mate quality and social status, respectively. Risk-taking in three other domains was unattractive. We found men know which risks women find attractive and unattractive. We also tested what happens when sex roles are reversed; perhaps males are good at predicting women's preferences simply because men's preferences for women are the same. Parallel studies run in the United States point to strikingly similar results. In the second part of this project we interviewed couples to contrast two possible mate choice mechanisms. One hypothesis is that women will see the behaviors they find most risky as particularly attractive, drawing them towards men that are indifferent to such risks; thus within a partnership there would be an inverse correlation between male and female perceptions of risky behavior (i.e. 'opposites attract'). An alternative hypothesis is that men and women sharing common risk attitudes are involved in the same activities and thus will be more likely to pair up, leading to a positive correlation (i.e. 'likes attract'). Couples were positively assorted for risk-taking, suggesting a 'likes attract' mate-choice mechanism.

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New Approaches to Physical Attractiveness, Chair: Nicholas Pound
Lecture Hall B, Friday afternoon

1.30 PM

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*MALE JUDGMENTS OF FEMALE WAIST-TO-HIP RATIOS: NEW INSIGHTS WITH A NEW
EXPERIMENTAL PARADIGM*

In the traditional procedure used to investigate male judgments of female waist-to-hip ratios (WHR), the participants are requested to (a) rank order line drawings of female figures which (b) are all known at the outset of the experiment and which (c) can be regarded as long as necessary for the completion of the task. In contrast, in the present study the participants (a) were unfamiliar with the set of stimuli used at the outset of the experiment; (b) in each trial they saw two female figures on a computer screen for 1250 ms, and (c) they were requested to indicate which of the two figures was more attractive, healthy, fecund and pregnant. The four different judgments were made block-wise in random orders. There were three levels of WHR (.5, .7, and .9) and three levels of body weight (underweight, normal, and overweight). The complete combination of the three levels of WHR and body weight resulted in nine pictures. In each block, 36 pairs of figures were presented resulting from the complete combination of the nine figures. The dependent variables were the frequency with which a figure was selected and the pertinent decision times. The results revealed a highly similar pattern for judgments of female attractiveness and health that was not found for judgments of fecundity and pregnancy. A WHR of 0.7 was chosen most frequently for attractiveness and health and these judgments were made highly significantly faster than judgments for pairs of figures without a WHR of 0.7.

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A NEW TECHNIQUE FOR ASSESSING FACIAL MASCULINITY

Researchers interested in assessing the extent to which individuals exhibit masculine facial characteristics have typically relied on subjective ratings of masculinity either obtained using rating scales, or derived from forced choice procedures in which subjects are asked to decide which face in a pair is more masculine. However, raters' understandings of what makes a face "masculine" may not correspond with biological sex differences in facial characteristics that arise as a consequence of differential exposure to sex steroids during development. Moreover, they may base their ratings on variation among faces on other dimensions that may or may not be correlated with the masculinity of the targets, such as attractiveness. The ecological validity of asking people to rate faces on a dimension such as masculinity is questionable but humans are expert at, and require little conscious effort when, making binary sex determination judgements. Consequently, we employed a brief exposure procedure in which subjects were asked to classify faces by sex to examine whether error rates and response times could be used as indirect measures of masculinity in target faces. There was a linear negative relationship between measures of masculinity obtained using this technique and ratings of attractiveness for female faces. For male faces, however, preliminary data indicate that there might not be a positive linear relationship between masculinity assessed in this way and attractiveness, perhaps reflecting the fact that previous studies have not found simple directional preferences for facial masculinity in men.

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*WHAT IS AN AVERAGE SHAPE AND WHAT IS AN AVERAGE TEXTURE? THE CAVEATS OF
USING MORPHING PROGRAMMES TO CREATE "AVERAGE" FACES*

Morphing programmes have been used quite extensively in evolutionary psychology to create "average" faces and warp the averaged faces along defined morphometric axis. Although the term average is used without much concern in the literature, a mathematical average can be performed only on scalar or vectorial variables and "shape" is neither a scalar nor a vectorial variable. The recent progress of geometric morphometry has allowed a landmark-based rigorous approach to shape statistics. Using this methodology, average shapes can be defined in a projection space (Kendall's shape space), however, the average shape critically depends on the choice of landmarks. Secondly, the outcome of a morphing procedure depends on the interpolant function. Many morphing programmes use elastic deformations. However, thin plate splines (TPS), is the interpolant function of minimum bending energy used in geometric morphometry. Here we will provide evidence that use of elastic deformation or TPS results in visibly different averages even when the same set of landmarks is used. Finally, up to now, an "average" texture was created by superimposing images warped to conform a consensus shape. This approach results in a very smooth skin texture because it dilutes all the blemishes of the individual textures. However, especially when thinking in biological terms, blemishes and imperfections are the relevant signals that should be detected and blending images completely abolishes these signals. Rigorous methods to calculate an average textures are yet to be developed.

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*AN ATHEORETICAL APPROACH TO EXPLAINING FEMALE PHYSICAL ATTRACTIVENESS DOES 50%
BETTER THAN THEORY*

The outline of the human female torso can be thought of as a complex waveform. Principal Component Analysis (PCA) can be used to extract statistically independent descriptors of this shape. We carried out such an analysis on a set of digital photographs of 60 women volunteers and computed the first 4 principle components (PCs). Next, we used the information from this image analysis in an experiment to reveal how changes in body-shape affect the perception of attractiveness. We applied the PCs to a standard image, which was produced by averaging together all 60 of the original images to produce a body of average size and shape. As a result we generated a stimulus set of 625 images, representing all possible combinations of the 4 PCs applied to the standard image at each of 5 equally sized increments (i.e. 5 x 5 x 5 x 5). These images were then rated for attractiveness by 40 observers (20 male and 20 female). Using these four PCs in a multiple regression model, we were able to explain over 90% of the variance in attractiveness ratings. In comparison, the use of other more conventional features, such as WHR together with BMI, (estimated from the perimeter/area ratios of the stimulus images), accounts for only ~ 60% of the variance in the same attractiveness ratings. These results strongly suggest that a new approach is required to determine the biologically meaningful features which humans use to judge female physical attractiveness.

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2.50 PM

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THE EFFECTS OF SHORT-TERM EXPERIENCE ON JUDGMENTS OF ATTRACTIVENESS

Adults rate average faces as more attractive than most of the faces used in their creation. Two explanations have been offered: (1) a cognitive explanation that average faces resemble internal face prototypes formed from experience and that familiar-looking stimuli appear attractive, and; (2) an evolutionary fitness explanation that average faces signal desirable genetic qualities related to health and that a preference for them has been selected for. Support for the evolutionary explanation is the finding that the phenomenon holds across faces and participants of different cultures and is unrelated to the amount of experience with the faces of the target ethnicity. Here we examined the stability of the preference for average faces by biasing participants' experience with faces. Participants (n=12 per group) first performed a memory task lasting 8 minutes in which all of the female faces to-be-remembered had their features placed in a low, average, or high position. In what was described as a separate experiment, participants were asked to move the features of a female face with averaged features to their most attractive vertical location. The most attractive height was affected by training condition ($p < 0.01$), with each group's most attractive height biased in the direction in which they were trained. The results indicate that internal face prototypes are constantly being updated based on experience. The results suggest that the preference for average is mediated through experience, and is not the product of a specific sensitivity to averageness as a cue to genetic quality.

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Emotion, Chair: Robert Aunger Lecture Hall C, Friday afternoon

1.30 PM

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SEX DIFFERENCES IN JEALOUSY: A META-ANALYTICAL RECONSIDERATION

Buss and colleagues (1992) initialized a new evolutionary research line by focusing on sex differences in reaction to emotional and sexual infidelity scenarios: Significantly more often than women, men choose their mate's imagined sexual infidelity to be more upsetting or distressing than an imagined act of emotional infidelity. The evolutionary versus socio-cultural interpretation of these findings, which have been replicated in a number of extension studies, is a matter of ongoing debate for more than a decade now.

In the last few years, an increasing number of studies, including one meta-analytical study, vehemently contradicted the evolutionary interpretation by postulating socio-cultural factors as a cause of sex-specific jealousy reactions, or by attributing the original-design findings to methodological artefacts (DeSteno et al., 2002; Harris, 2000, 2002, 2003). Also these studies themselves became a target of methodological and conceptual critique. They therefore must be considered as doubtful counter-concepts to the evolutionary research line.

In this paper, we will (1) present the first full meta-analytical overview of previously published data ($k = 42$, total $N = 16421$), (2) discuss methodological criticisms of the entire research program, and (3) plead for a sensible integration of both ultimate and proximate levels underlying the jealousy reaction.

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1.50 PM

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*EXPLORING THE ORIGINS OF THE SEX DIFFERENCE IN DISGUST SENSITIVITY:
A TEST OF THE MALE SIGNALING HYPOTHESIS*

Numerous investigations have documented a robust sex difference in disgust sensitivity, a pattern which, to date, remains unexplained. We hypothesized that this sex difference may derive in part from the messages communicated by male behavior in the presence of contaminants. First, we postulated that male disgust insensitivity may signal to female observers that the actor is of high genetic quality, as such behavior reveals sufficient immunorobusticity as to allow him to undergo exposure to pathogens with impunity. We therefore predicted that a moderate level of disgust insensitivity would increase a target male's desirability as a partner, particularly when the target male displays secondary sex characteristics indicative of high levels of testosterone, an immunosuppressant. Second, we postulated that male disgust insensitivity may signal to male observers that the actor is indifferent to risk, and thus constitutes a formidable opponent in male-male conflict. We report results from a large Internet study in which female and male participants assessed a hypothetical male after reading vignettes containing information about his level of disgust sensitivity.

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2.10 PM

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*AN EVOLUTIONARY APPROACH TO UNCOVER CHILD-REARING PRACTICES THAT CONTRIBUTE
TO THE PREVALENCE OF ANXIETY DISORDERS*

Anxiety-related disorders are among the more common ailments of modern societies. Apparently their prevalence is partly due to environmental factors, which suggests that anxiety may be one of the health problems that are aggravated by discords (adverse mismatches) between the present way of life and what our genes are adapted to. Consequently, it may be possible to find preventive measures by using the perspective of evolutionary medicine. I shall argue that the prevalence of anxiety-related problems reflects that the nerve circuitry and endocrine activity associated with the fear function have expanded beyond normal. Moreover, that the expansion may be due to excessive or abnormal triggering, particularly at an early age. Possible discords that could be responsible for this situation, such as present child care practices, will be suggested. An ongoing research program that may support or undermine these suggestions will be presented.

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2.30 PM

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NICHE COMPLEXITY, EMOTIONS AND THE EVOLUTION OF NERVOUS SYSTEMS

A variety of explanations have been put forward to explain the evolution big brains, ranging from suggestions that it has been the result of 'runaway' sexual selection or a switch in diet, to the need for greater social intelligence, to the need to radiate heat, or as a side-effect of memetic 'mind' parasites. However, these theories are restricted to recent brain evolution. We provide evidence that a single cause can explain the long-term evolution of nervous systems, and that the evolution of big brains in primates follows the same causal path. This cause is increased niche complexity. As species fill existing niches,

some resort to more specialized ones, and to adapt to these niches evolve more sophisticated nervous systems to keep track of fast-changing or hard-to-evaluate environmental parameters. Niche reconstruction by brainy organisms has also become increasingly important over time, such that niches become more complex through the activities of these organisms themselves. We further argue that as niches have become more complex, the number of tasks important to fitness has increased. Those tasks which exhibit stable kinds of input stimuli and regularized behavioural responses have resulted in the evolution of modularized response systems commonly called emotions.

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ATTENTION AND FEAR: DOES FEARFUL STIMULI DRIVE ATTENTION?

The research aimed to examine attentional selectivity for pictorial stimulus in a visual search paradigm using pictures of snakes and spiders as fear-relevant stimuli, and cats and fishes as neutral stimuli. In the first experiment, clearly contradicting the hypothesis of the study, participants proved faster (shorter reaction times) at detecting neutral than fear-relevant targets. One possible explanation given for this pattern of results was attributed to eventual perceptual features of the stimuli. Having taken this into consideration, the second experiment aimed to investigate if the results obtained in the first were somehow related to perceptual confoundings (e.g., the background) of the pictures. However, the data from the second experiment followed a similar pattern to the data gathered from the first experiment. The purpose of the third experiment was to investigate anxiety related differences in attentional capture by using a visual search paradigm also with pictures of snakes and spiders as fear-relevant stimuli, and cats and fishes as neutral stimuli, but by comparing detection of feared and nonfeared stimuli in participants, either snake or spider fearful. The results fully confirmed the main hypothesis of the study. Participants fearful of either snakes or spiders were faster at detecting the congruent feared stimulus (snakes and spiders, respectively), when compared with non fearful participants. It is suggested that emotional significance may be an important factor drawing attention to a particular spatial location.

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Evolution and Cognition (Symposium), Chair: Clark Barrett
Lecture Hall D, Friday afternoon

EVOLUTION AND COGNITION

Evolutionary approaches hold great promise for uncovering the design features of the mind's cognitive mechanisms. This symposium will bring together a variety of researchers who are bringing evolutionary ideas to bear in attempting to unravel the structure of human cognitive architecture.

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1.30 PM

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EVOLUTIONARY THEORY: EVEN SOCIAL CONSTRUCTIONISM REQUIRES IT

Evolutionary psychology can be attacked by social constructionist psychologists on two fronts. First, such critics will argue that evolutionary theory is itself a social construction and therefore it has a problematic status with regard to understanding human nature. A second criticism is that evolutionary psychology commits to a form of cognitive internalism that underplays the role of social processes in accounts of human nature. The first criticism relies upon an epistemological viewpoint that can either collapse into utter relativism, or that can be usefully reconsidered as compatible with a form of pragmatic instrumentalism. This pragmatic position, whilst recognising the fallibility of scientific theory and the social processes surrounding it, also allows us to take seriously the empirical successes of evolutionary theory, thereby weakening the first line of attack from social constructionism. The second criticism relies upon a belief that cognitive internalism is essentialist. This belief is wrong, and the paper will show, through a discussion of information theory, not only how evolutionary psychology thinks about agency, but also how social constructionist accounts themselves rely upon a tacit notion of information and systems. What is lacking in social constructionist accounts is a theory of function, and evolutionary theory could fill this role with a proper account of social functions. Without a theory of function, social constructionism can only ever aspire to natural historical accounts of behaviour at best.

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FREQUENCY IS AS FREQUENCY DOES: WHEN DO PEOPLE REPRESENT STATISTICAL INFORMATION AS FREQUENCIES?

Natural frequencies (e.g., “12 out of 100 individuals”) have been shown to facilitate performance in tasks such as Bayesian reasoning problems. An ecological rationality view has proposed that this effect is due to natural frequencies being a cognitively privileged representational format. This position has been challenged by the finding that information expressed as chances elicits the same good performance as natural frequencies. Specifically, this result occurs with the use of “chance” frequencies (CFs) that are numerically similar to natural frequencies (e.g., “one individual has 12 out of 100 chances”). Although one can argue that CFs are single-even probabilities, it could also be argued that they are de facto NFs. The crucial opinion in this case is not that of the theorists but the research participants; how do participants interpret CFs? A series of experiments, using a Bayesian reasoning task (the medical diagnosis problem), demonstrate that performance is improved more by clearly presented NFs than by CFs. Additionally, when CFs are used there is a differential improvement in performance for participants who nevertheless interpreted the information as NFs. This result is found for tasks in which statistical information is manipulated throughout the problem, as well as for problems that vary only in styles of the final prompt question when given the same CF problem text.

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*WHY YOU HAD TO BE THERE: TOWARDS A COMPUTATIONAL MODEL OF HUMOR-AS-
ENCRYPTION*

This talk will present a computational model of a relatively unexplored feature of the production and processing of humor – encryption. Drawing on the framework of Relevance Theory, this hypothesis proposes that a necessary component of humorous production is the compression of multiple, divergent lines of inference within a given utterance. Only those individuals who share the assumptions necessary to derive the extra implicatures are able to decrypt them, and to draw additional inferences about the producer of the humor, including the inference that the producer and audience share these implicit assumptions. Such a system provides an avenue for iterated, low-cost honest signaling of some kinds of locally variable similarity. This may have evolved as a solution to the problem of assessing compatibility in long-term interaction partners, such as mates or friends, in order to minimize coordination costs. Preliminary empirical results will be reviewed.

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2.30 PM

Tanya Behne
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A DEVELOPMENTAL AND COMPARATIVE VIEW ON ASPECTS OF INFANT SOCIAL COGNITION

The most fundamental cognitive skills involved in processes of cultural evolution are those involving an understanding of persons and their actions. The research I want to present investigates similarities and difference between human infants and non-human apes in their understanding of others as intentional and communicative agents. Both human infants and chimpanzees show some basic understanding of intentional action, but only human infants show some evidence of understanding communicative acts. The implication for infants' ability to join into cultural learning processes will be discussed.

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Consumer Behavior (Symposium), Chair: Siegfried Dewitte
Audimax, Friday afternoon

CONSUMER BEHAVIOR IN AN EVOLUTIONARY PERSPECTIVE

Currently, the field of consumer behavior lacks an underlying theoretical framework. However, consumption decisions have a clear impact on survival and reproduction. This is the case in modern times, but was also the case in our EEA. Therefore, it is reasonable to assume that humans have evolved adaptations to optimize this type of decisions, and that these decisions will vary with motivational concerns. In this symposium, we bring together emerging ideas and data on this topic. In the first talk (Vyncke), this motivational system is reviewed and gender differences are reported and interpreted in terms of this system. In the talks of Poels and Vantomme, these gender differences are applied to understand differential advertisement effects. Poels found that likeability of advertisements are affected by the emotional reaction to the ads, and that this reaction depends on gender. Vantomme shows that attitudes measures that are not distorted by conscious deliberation, reflect mate selection motivation. The talk by Pandelaere, Dewitte, and Warlop shifts the focus to the decision to spend or not, and also reports gender differences that are in line with the motivational system introduced above. Products men and women invest in are different. The talk of Delmotte shows that Darwinian thinking not only helps us

understanding consumer decisions, but can also be applied to other market phenomena, such as brand success. Here, the consumers become the selecting environment for the brands.

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4.35 PM

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ROKEACH REVISITED: THE CONCEPT OF VALUES

Last year, at HBES Nebraska we presented a paper reconsidering the concept of motivations. This concept is central to the theory of consumer behaviour – and by extension – of human behaviour in general, since it refers to fundamental human drives. As such, it clearly fitted into the perspective of evolutionary psychology. This concept, dominating the literature on consumer psychology since Maslow, is now being replaced by the value concept in theories of consumer behaviour. Values then refer to 'the things people find important in life'. Following the ideas of Reynolds, Gutman and Olson, communication management is now considered to be all about appealing to the values of potential target audiences.

Now, the values concept is clearly a SSSM concept, referring to the fact that values differ from culture to culture, from time to time, from place to place. In this paper we will investigate differences in value patterns between men and women. We start by revisiting the most famous value inventory ever, that is, the one developed by Rokeach. Results stemming from a survey amongst more than 1000 Flemish respondents then clearly reveal that differences in value patterns between men and women (concerning partner relations, friendship relations, kin relations, things that can happen to you, etc. : we investigated more than 120 variables) fit into the theory of evolutionary psychology. This leads us to suggest the principle of 'prepared learning' as a bridge between evolutionary psychology and the SSSM.

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*EXPLICIT AND IMPLICIT ATTITUDES TOWARDS ADVERTISEMENTS PORTRAYING MEN
IN DIFFERENT ROLES*

Until now, little research has been done on the effectiveness of advertisements depicting men in different roles. The current study examined not only explicit but also implicit attitudes towards advertisements using different male role portrayals. Explicit attitudes are attitudes that operate in a conscious mode and are measured by self-report tasks. Implicit attitudes are automatically activated attitudes that influence consumers' behaviour beyond their awareness or control. Implicit attitudes are measured by response latency measures such as the Implicit Association Test (IAT). In the experiment, attitudes towards ads that portrayed men in a stereotypical role (a construction worker and a mechanic) and ads that depicted men in an a-stereotypical role (a nursery school teacher and a male nurse) were measured. The explicit measure showed no differences in consumers' attitudes toward the two types of advertisements. The IAT revealed more positive implicit attitudes towards the a-stereotypical than towards the stereotypical advertisements. However, gender moderated this result: women implicitly preferred the a-stereotypical advertisements, while men showed no preference. Current results can be explained from an evolutionary point of view. Explicitly no preference is found because respondents are either unwilling (social desirability bias) or unable (complex neural circuits inaccessible to humans guide behaviour and emotions) to reveal their attitudes. At the implicit (unconscious) level, women prefer –due to the mechanisms of mate selection- the image of the caring man that represents (parental) investment. Men

are equally positive toward the two types of advertisements because -for them- both images lead to reproductive success (cf. Madonna-Whore dichotomy).

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THE IMPACT OF MOTIVATIONAL APPEALS ON EMOTIONAL ADVERTISING PROCESSING

Recently, several researchers in the field of advertising and consumer research have integrated neurological and evolutionary views on emotion into their research. In sum, these researchers describe the advertising process as primarily emotion-based. In this paper, we want to go one step further and ask another important question: why do some ad stimuli evoke an emotional reaction? The answer lies in the concept of motivation. We study motivation from an evolutionary point of view. The main objective of this research was to investigate whether advertisements with a motivational appeal evoke significantly stronger emotional reactions compared to advertisements without motivational appeal. We also looked at the impact on ad likeability. Product interest and affect intensity were included as potential moderating variables. Twelve print advertisements were used: three with a general motivational appeal, three with a male-oriented motivational appeal, three with a female-oriented motivational appeal, and three without motivational appeal. Emotional reaction was measured on three dimensions: pleasure, arousal and dominance by means of the non verbal scale AdSAM®. Results reveal higher scores on the pleasure and arousal dimension and on ad likeability for advertisements containing a motivational appeal. For the male- and female-oriented appeals results show significant sex differences for the pleasure and arousal dimensions and for ad likeability. For some advertisements, product interest clearly moderated pleasure, arousal and/or ad likeability scores whereas affect intensity only had a marginal moderating effect. We conclude that evolutionary insights on motivation can help advertising practitioners to design more effective advertising appeals.

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SPENDING HURTS BUT MAY YIELD FUTURE RETURNS. TWO SIMPLE HEURISTICS UNDERLYING THE DECISION TO SPEND

The decision to spend or to save might be older than the origin of money. Before the invention of money, people could accumulate trade exchange power by means of products or social credit. The decision to spend or keep this capital has obvious implications for survival. In two studies in which participants made a series of spend/ save decisions, we investigated two postulated heuristics that regulate spending behavior: the pain of spending and the perceived future return. The pain of spending favors saving over spending and the perceived future return favors products with long term benefits to products with short term benefits. Which combination of those heuristics is most optimal in which circumstances? We looked at the influence of product type (impulse product, durables, and entertainment products), sex, opportunity to borrow, and interest rate. We found several indications that the two heuristics influenced the decisions. Furthermore, low interest rates increased spending in people with a strong future return heuristic only. For women, the affected products were durables, and for men entertainment products. This suggests that entertainment products have a longer future return (e.g. in mate value) for men than for women and vice versa. This in line with some recent anthropological literature suggesting that in comparison with women's

work men's work is less economically productive (durables) but has higher signaling value (entertainment).

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Gino Delmotte
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*THE FITNESS INDICATOR APPLICATED TO BRANDS. A DARWINISTIC MODEL ON
BRAND RESEARCH*

This investigation deals with the Darwinian theory of evolution, driven by natural and sexual selection. In particular it is based on the thesis developed by Geoffrey Miller (The mating mind, 2000) and Etcoff (The survival of the prettiest, the science of beauty, 1999). The purpose is to find out if Darwinian principles are applicable to the non living world such as the world of brands.

A Methodology has been developed to measure and to predict the success of brands (fitness) by means of adaptability and sexyness. Adaptability is seen as the accumulation of elements such as: price, applicability, service, productivity, quality, ... Sexyness should be considered as an added value to the brand influenced by sexual ornaments, as: waste, aesthetics, humour, mythology, eroticism,...

The hypothesis states that the brands sales are highly influenced by adaptability and sexyness.

An application of this methodology has been executed on Belgian politicians (seen as brands), on carbrands and on magazines. Results of fitness of the brand under investigation and the underlying elements of adaptability and sexyness are put forward on a mapping together with the results of competitive brands.

The results show that there is a clear coherence between the fitness of a brand and its sales.

This research model is appropriate: to learn more about a brand and its competitors, to understand why a brand is at that specific position, to solve weaknesses, to take opportunities, and to move to a better place.

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Grandparental Investment (Symposium), Chair: Harald A. Euler
Lecture Hall A, Friday afternoon

GRANDPARENTAL INVESTMENT

Grandparental investment in grandchildren and the effects on grandchild survival and grandchild birth intervals, which bears on the status of the Grandmother Hypothesis, has in the past been shown to be dependent not only on type of grandparent but also on socio-economic and parental conditions as well as on the dependent variable. Especially the question whether grandparents other than the maternal grandmother contribute to reproductivity of their adult children is unclear. The role of grandparents on grandchild survival is investigated in three historical samples. In an 18th century Quebec population, Jan Beise finds a beneficial effect of the existence of the paternal grandmother on grandchild survival which is attributed to specific Québécois socio-ecological conditions. This finding is corroborated by Gillian Ragsdale in a historical English sample who finds beneficial effects of both type of grandparents on grandchild survival but not on interbirth interval. Ariane Kemkes-Grottenthaler even finds that in a historical patrilocal German sample the paternal grandfather contributes to grandchild survival during the first year of life. Among the matrilineal Khasi of northeast India, Leonetti, Nath, and Hemam could detect a beneficial effect of the existence of the maternal grandmother on marital stability of their daughters. Harald Euler showed in a current German sample that the effect of parental birth rank on grandparental solicitude is minimal, but that paternal grandparents unexpectedly cared less for a grandchild if the son was an only child than if he had a sibling, regardless of sex of sibling.

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THE HELPING AND THE HELPFUL GRANDMOTHER - THE ROLE OF MATERNAL AND PATERNAL GRANDMOTHERS IN CHILD MORTALITY IN HISTORIC QUEBEC

The effect of grandparents and in particular grandmothers on child's mortality was studied in the population of historic Quebec (1680-1750). The population consisted of French immigrants who started to settle in Quebec in 1621, and their descendents. The results show that the only truly helping grandparent is the maternal grandmother. With her being alive, the risk to die decreased for grandchildren by around 20 to 30% at the ages one and two years while there are no effects before and after. This time pattern makes it likely that her support is connected with the process of weaning. Furthermore, it seems that children of young women benefited most from the grandmother's help. Contrary to comparable studies, which could not find any beneficial effects by the paternal grandmother, this study found a beneficial effect on the survival. But this effect is limited to the neonatal age (first month). We argue that this effect is not due to a direct grandmaternal support for the child but rather reflects her efforts in improving the mother's environment during pregnancy which influences the fetus viability by mediation through the mother's physical well-being. The reason for this variability in the paternal grandmother's behavior may lie in the specific socio-ecological conditions of Quebec in which women and therefore mothers were a rare "resource". Under these special conditions, the usually tense relationship between mother- and daughter-in-law probably eased and the mother-in-law turned out to be even helpful for the child's survival by improving the mother's health condition during pregnancy.

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GRANDMOTHERING IN CAMBRIDGESHIRE, 1770-1861

The effect of grandparent survival on child survival and mean interbirth interval, both independent of and relative to parent survival, was investigated in a historical population. Families for the data set were reconstituted from the parish and census records of Cambridgeshire, 1770-1861. In a logistic regression analysis, only the mother's and the maternal grandmother's survival were found to be significant predictors of child survival. Maternal grandmother survival was found to influence child survival both via maternal survival and independent of maternal survival. Grandparent survival was not found to influence mean interbirth interval. These findings are reviewed with respect to other studies of grandmothering and the Grandmother Hypothesis.

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DOES GRANDPA MATTER? GRANDPATERNAL INVESTMENT AND OFFSPRING SURVIVAL

The existence of grandparents contributes positively to inclusive fitness by extending support to second generation offspring. While grandmothers are particularly important, grandfathers are thought to have no effect. However, in patrilocal stem families characterized by a residence pattern in which the head of the household, his wife, their adult sons, their unmarried daughters, and their grandchildren share a common home, the paternal grandfather has tight authority. In order to explore this assumption, historical data

from family reconstitution (1703-1925) were analyzed. The sample is believed to represent a natural fertility population during the pre-industrial phase. The initial investigation shows that – next to both grandmothers – the paternal grandfather is positively associated with grandchild survival during the first year of life. In order to explore this effect in more detail, a more stringent statistical approach (including various covariates) is emphasized.

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GRANDMOTHER EFFECTS ON MARITAL STABILITY AMONG THE KHASI OF N.E. INDIA

The role of the grandparental generation in arranging and supporting the marriages and thus reproductive opportunities of their offspring is well known. This abiding intergenerational concern and involvement in marital arrangements suggests that marital stability may also be subject to grandparental effects. Among the matrilineal Khasi of N.E. India, marital stability is highly valued but women and men can divorce and remarry freely. Many women stay married to first husbands who father all of their children. Others, after bearing children by a first husband, divorce and go on to second or third husbands by whom they bear further offspring. At ages 45-50 years, 27% have borne children by two or more husbands. In a sample of 650 Khasi women ages 16-50 years we use Cox proportional hazards analysis to assess the risks of proceeding to bear a subsequent child by a new husband, as influenced by the living status of the maternal grandmothers. The risk at each age of the mother at her births and the risk at each birth order are significantly reduced by a grandmother's living presence. We discuss the evolutionary implications of such effects on the reproductive success of daughters.

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5.55 PM

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GRANDPARENTAL SOLICITUDE AND PARENT SIBLING CONSTELLATION

A parent birth order effect on amount of current contact of adult grandchildren with their grandparents (less contact if parent was middle-born) was found by Salmon (1999). With ratings of grandparental solicitude during childhood this effect could be replicated in a sample of N=840 only with very small effect sizes. Additionally, an expected solicitude diffusion effect was found superimposed on the known lineage and grandparent sex effects: the more siblings the parent had, the less grandparental solicitude for the adult target grandchild. Finally, a clear and repeated effect of sibling constellation on paternal grandparental solicitude was detected, not to be seen with maternal grandparents: Paternal grandparents cared less for a grandchild, if the son was an only child than if he had a sibling, regardless of sex of sibling. Various hypothesis to account for this effect (e.g. sibling equity; mother-in-law/daughter-in-law conflict; son-and-heir) are discussed.

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Evolutionary Thinking in Sociology (Symposium), Chair: Rosemary L. Hopcroft
Lecture Hall B, Friday afternoon

EVOLUTIONARY THINKING IN SOCIOLOGY

Sociology and Demography since the 1960s have seen the wholesale importation of statistical methodologies from other disciplines, to the extent that the use of such methodologies has become mainstream practice. Unfortunately, theoretical development has lagged, and both sociology and demography have become home to an abundance of empirical findings with no central unifying paradigm besides the notion that social forces are an emergent property of all human societies, guiding individual behavior. Evolutionary theory can fill this theoretical vacuum; and can explain and unify the mass of empirical findings across all areas within sociology and demography. Further, the existence of a wide variety of datasets on representative samples of populations gathered for sociological and demographic purposes provides a wealth of data for evolutionary researchers. The four papers in this session show how sociological and demographic data can be used to test evolutionary hypotheses or illuminate evolutionary ideas: about the determinants of happiness, fertility behavior, the human pair bond, and culture.

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Hans-Peter Kohler
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*PARTNER + CHILDREN = HAPPINESS? AN ASSESSMENT OF THE EFFECT OF FERTILITY
AND PARTNERSHIPS ON SUBJECTIVE WELL-BEING IN DANISH TWINS*

Economic and rational choice theories suggest that "Partner + Children = Happiness": individuals form unions or have children because these decisions increase their subjective well-being or "happiness". In this paper we investigate this relation using within-MZ (identical) twin pair estimates based on Danish twins aged 25-45 and 50-70 years old. The findings include: (1) Currently being in a partnership has large positive effects on happiness, and these gains are not affected by the partnership history or the presence of children. (2) A first child substantially increases well-being, and males enjoy an almost 75% larger happiness gain from a first-born son than from a first-born daughter. (3) Additional children beyond the first child have a negative effect on subjective well-being for females, while there is no effect for males. (4) An early onset of childbearing is associated with large negative effects on well-being for females but not for males. (5) Ever having had children does not contribute to variation in the subjective well-being of males or females aged 50-70 years

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Sean Cunningham
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*SOCIAL CLASS & FERTILITY IN POST-DEMOGRAPHIC TRANSITION AMERICA: AN
EVOLUTIONARY ANALYSIS*

Disputes the common notion in demography that the previously direct relation between social class and fertility has become inverse post-transition. Its uncritical acceptance has been used to discredit current evolutionary approaches to reproductive behavior. As a rejoinder, the accuracy of operationalizing fertility based on female births is attacked, since males have much greater variance in number of progeny. A sociobiological model initially devised by Van den Berghe and Whitmeyer (1990) is then put forth. Operationalizing fertility via males' children and grandchildren, a curvilinear relation between social class and fertility is predicted with three class-specific strategies: 1) Lower class individuals are expected to

utilize an r-strategy (i.e., maximizing quantity of progeny over quality); 2) Middle through lower upper class individuals a k-strategy (i.e., maximizing quality); and 3) Super-status individuals-the top 5% of the income distribution-a hybrid r/k-strategy (i.e., maximizing both quality and quantity). To buttress the model, the sociobiological prediction that super-status males have greater fertility than their female counterparts is examined; and also put to the test is the Trivers/Willard hypothesis (1972), which contends that the sex ratio amongst upper class individuals will be biased toward the male end, while the opposite holds true for the lower class. Statistical analysis is conducted via OLS regression using a nationally representative data-set, "Americans' Changing Lives: Waves I and II, 1986 and 1989". This survey was unique in providing information on children living outside respondent household, as well as grandchildren-both crucial to accurately operationalize fertility.

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5.15 PM

Satoshi Kanazawa
London School of Economics

WHERE DO CULTURES COME FROM?

I seek to make three separate contributions to the sociology of culture. Metatheoretically, I offer the evolutionary psychological perspective within which to study culture and generate specific theories of the origins, constancy, and variations in human culture. Theoretically, I provide a concrete evolutionary psychological theory of son-daughter preference, why people in some societies prefer sons to daughters and practice female infanticide, while those in others prefer daughters to sons and practice male infanticide (killing of boys). Empirically, I test and support my evolutionary psychological theory of son-daughter preference with large, international quantitative data both at the micro and macro levels.

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5.35 PM

Timothy Crippen
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THE FRAGILE FOUNDATION

In practice, the human pair-bond is an alliance between males and females that yields a variety of economic, emotional, and reproductive dividends. Despite the payoffs, these alliances are fraught with tensions that, not uncommonly, result in their dissolution. The durability of specific human pair-bonds is tenuous, at best. And yet, the relationship endures as the principal organizational mechanism around which all other aspects of human social life revolve. A structure that is, in practice, elusive to maintain is, at one and same time, an organizational strategy that undergirds the relatively stability of institutional relations in all known human societies.

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5.55 PM

Rosemary Lynn Hopcroft
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*THOSE WHO CAN DO: SEX, STATUS AND REPRODUCTIVE SUCCESS
IN THE CONTEMPORARY U.S*

In this paper, I reexamine the relationship between cultural and reproductive success using data on the biological children and frequency of sex for both men and women from various waves of the General Social Survey (GSS). Controlling for age, I find in an OLS regression that high income men have more biological children than all others. I also find that more educated men have more biological children than more educated women. Second, in an ordered probit analysis of data from the 1989-2000 samples of the GSS controlling for age; I find that higher income men have greater potential fertility (measured as frequency of sex) than all others, and higher prestige men have greater potential fertility than all others. Results also suggest that intelligence may depress achieved (number of offspring) and potential fertility for both men and women. These results demonstrate the substantial relevance of evolutionary psychology and evolutionary biology to fertility behavior in modern societies.

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New Perspectives in Darwinian History (Symposium), Chair: Walter Scheidel
Lecture Hall C, Friday afternoon

NEW PERSPECTIVES IN DARWINIAN HISTORY

Evolutionary theory still occupies an extremely marginal position in the study of history. The few existing practitioners mainly come from outside the historical profession (usually from anthropology and psychology), and mostly receive attention within the HBES community but remain largely unknown to mainstream historians. Meaningful contacts have been limited to inherently interdisciplinary areas such as historical demography. While ideological preferences among historians may well account for much of this enduring separation, practitioners of Darwinian history also need to address the possibility that this lack of communication may persist for more rational reasons. Hence, the four papers in this panel share a common objective: to explore the relationship between evolutionary theorizing and the methods and concerns of mainstream history, and to assess the chances of Darwinian history to gain recognition within the historical discipline. Comprised of two historians (Scheidel, Wettlaufer) and two anthropologists (Betzig, Hakami), this panel is designed to stake out some middle ground for mutual interaction. Betzig, in the first paper, expands on her earlier work on the relationship between political power and reproductive success. In a further step, Wettlaufer makes a case for a 'Darwinian cultural history' that links biological features to cultural transmission. Hakami takes a fresh look at the connection between kinship and war that lies outside the ambit of conventional historical studies, and reconsiders the compatibility of evolutionary and culturalist approaches. Finally, Scheidel draws on these contributions and existing publications to address the question to what extent Darwinian theory can be of use to historians, and sketches out an agenda for future work.

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4.35 PM

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POLITICS AND SEX IN THE BIBLE

In The Origin of Species and Selection According to Sex, Darwin said animals compete for what they need to reproduce. In the last half of the 20th century, that relationship was looked for around 700 times, and almost always found. Sometime after the 10th century BC, the first historians had already written it into the Bible. In the Old Testament, men with high rank--patriarchs, judges, kings--have more wives, concubines, servants, and slaves. And they father many children. Hebrew patriarchs act on a mandate from God to reproduce. Not till 42 generations after Abraham, and 28 generations after David became Israel's king--at the beginning of our era, when Rome was becoming an empire, and Joseph was becoming Jesus' father --was the Hebrew mandate to reproduce turned into a Christian mandate to stay chaste.

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HISTORY, CCLTURE AND EVOLUTION. NEW PERSPECTIVES IN DARWINIAN HISTORY

It is well known that human behavior largely depends on and is regulated by proximate cultural institutions such as traditions, laws and customs. The way in which these institutions are influenced by adaptations is yet unclear. I will present a new approach that tries to investigate the biological foundations of culture through the observation of "adaptive knowledge" and its transmission and use in history.

This alternative way of linking evolution and history will be exemplified by two studies on human behavior in the past: a) The problem of meaning and relevance of the so called "right of the first night" (*jus primae noctis*), especially in late medieval Europe and b) an ongoing study on the affect "shame" in social and historical perspective. The idea of the *jus primae noctis* is apparently backgrounded in social competition and is a metaphoric description of such conflicts. It is hypothesized that such knowledge about problems of social competition or resource conflicts and mechanisms to solve them has been adaptive for individuals in the past and was therefore preserved via oral traditions or writing for transmission from one generation to another.

One instrument to enforce the authority of this "adaptive knowledge" might be emotions, for example shame as a means for group coherence. With reference to current work of evolutionary anthropologists about the adaptive functions of emotions, I will outline some ideas about the possible role of emotions in regulating the social interaction of group members in medieval and early modern societies.

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5.15 PM

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FITNESS: INCLUSIVE OR INFRASTRUCTURAL?

As an anthropologist who is mainly concerned with the Theory of Social Evolution based on modern Cultural Materialism, I do have a great deal in common with Sociobiology and related approaches, insofar as both research strategies have similar epistemologies, but - as Marvin Harris states - radically different theoretical principles. Both are concerned with and built upon the idea of universal adaptive processes responding to environmental conditions, but whereas the latter tries to explain human behavior

exclusively in terms of biological principles, the former relies on thoughts about the deterministic impact of the productive conditions of a given society, without denying that biological factors may also be present in human culture. By expanding the critical remarks of Harris and Marshall Sahlins, I will concentrate on the central question of kinship systems and - going beyond Sahlins - their meaning for the phenomenon "war", which sociobiologists have also tried to explain in terms of human aggression. Unfortunately, anthropologists have mostly criticized the biological explanations for both topics independently of one another. But since there seems to be a significant correlation (and even a causal relation) between war and kinship, as investigated by comparative anthropologists, the two traces of criticism towards sociobiological explanations should also be correlated.

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5.35 PM

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IS DARWINIAN HISTORY POSSIBLE?

Darwinian history has not been a success story among professional historians. Even if it were not largely unknown to most practitioners in that discipline, the application of evolutionary theory to the study of human behavior in the past would inevitably encounter two main obstacles: reservations rooted in ideological preferences, and doubts about the relevance of evolutionary perspectives and questions to the agenda of mainstream history. Both issues require our attention. What is the common ground between the two fields? In principle, history is concerned with the study of human behavior, and therefore stands to benefit from Darwinian contextualization. At first sight, the Darwinian focus on evolved mechanisms and propensities seems to mesh poorly with historical interests in diversity and change. At the same time, analysis of how biological features relate to and interact with environmental (cultural) conditions has long been a key strategy of evolutionary studies, and could easily be accommodated within the traditional concerns of historical scholarship. Unfortunately, the emergence of Darwinian history has coincided with the relative decline of social science history and the ascent of deliberately 'fuzzy' cultural history that celebrates diversity for its own sake and is often informed by ideological tastes that are intrinsically opposed to evolutionary concepts. More than anything else, these shifts within the historical profession continue to militate against Darwinian history. After considering the potential contribution of evolutionary concepts to historical knowledge, the paper concludes by developing a road map for the integration of evolutionary perspectives into mainstream history.

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Evolutionary Psychology and the Social Sciences, Chair: Julie Coultas *Lecture Hall D, Friday afternoon*

4.35 PM

Charles Efferson
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DYNAMIC COUPLING: ECONOMIC GROWTH AND POPULATION BIOLOGY

Economic growth theory involves numerous models addressing why the growth rates of per capita consumption differ among countries. Because labor is central to economic growth, these models typically include a model of population dynamics, and thus the study of economic growth intersects squarely with ecology. Indeed, virtually any model of economic growth can be interpreted as a specialized form of the consumer-resource models prevalent in ecology.

Unfortunately, economic growth theorists often assume exponential population growth. They have thus failed to incorporate a critical lesson of modern ecology: the importance of non-linear feedbacks. Many consumer-resource models from ecology, however, are not suitable as alternatives because they do not

typically allow the consumer species to intensify production of its resources. The current study rectifies this problem with models that integrate the economists' treatment of resource production with the ecologists' treatment of population dynamics. The additional nonlinearities in these models produce dynamic regimes that economic growth theorists have not previously examined. In particular, many of the models can generate the threshold effects considered so important in economic growth theory with fewer assumptions than conventional growth models. This study is the first part of a larger study that will revise economic growth theory to render it more consistent with human evolutionary ecology. The second part of the study will focus on modifying the behavioral assumptions of economic growth models in light of current evolutionary theories of human behavior.

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4.55 PM

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SMART MOBS: IS THIS WHERE E-LEARNING MEETS EVOLUTIONARY SOCIAL PSYCHOLOGY?

E-learning can be defined as any learning that is facilitated by information and communications technology (ICT). The effective use of ICT to facilitate learning is of interest to educators, corporate businesses, and government bodies. However, it is often self-organising groups of young people who utilise the new communications technology to its ultimate degree. Some evolutionary social psychologists take an interest in conformity and social influence and this is where the potential for a synthesis between research on e-learning and research on social learning from an evolutionary perspective (Coultas, 2004) can be explored. Smart Mobs is a term introduced by Rheingold (2002) who argues that the convergence of popular culture, cutting-edge technology, and social activism demonstrates that the real impact of mobile communications will come from how people use it. Many-to-many mobile communications, for example texting, allow for a type of social influence that is faster and more ubiquitous than anything seen before. The extensive networks of teenagers in Tokyo and Helsinki and the convergence of social activists in Manila and Seattle are examples of the socially sophisticated use of communications technology (Rheingold, 2002). In this talk I will discuss two types of social influence/learning (using communications technology) that can be viewed from an evolutionary perspective: reputation management and cooperation on a large scale.

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5.15 PM

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*A CROSS-NATIONAL COMPARISON OF AFFIRMATIVE ACTION PROGRAMS FROM
EVOLUTIONARY AND CULTURAL PERSPECTIVES*

Affirmative action is a government policy permitting employers and universities to give preferential treatment to applicants from specific (e.g., racial) groups. We present a comparative analysis of affirmative action in six countries (India, Malaysia, Canada, South Africa, Brazil, and the US) and explain similarities among these programs according to universal psychological mechanisms and variation according to cultural-historical contexts. Fairness (stemming from the mechanism of reciprocation) is a common theme in the origins of affirmative action programs. They attempt to remedy past discrimination that limited economic and educational opportunities for oppressed groups. Yet unfairness (stemming from aversion to cheaters) is a common criticism of affirmative action programs—allowing presumably under-qualified people to be hired over those who are more qualified. Drawing somewhat arbitrary distinctions among groups (stemming from in-group/out-group categorization) is another theme. This has led to difficulties in dealing with multiple group memberships (e.g., individuals who are multi-racial) and exacerbated in-group/out-group distinctions. Due largely to historical circumstances, affirmative action programs differ in the type of groups (e.g., racial, sex, ethnic, or caste) given preferences. Other

differences occur in the operation of these programs (e.g., discretionary or state implementation; self- or other-nomination), stemming from unique political and bureaucratic traditions. We conclude with suggestions for modifications to affirmative action programs that, on the one hand, help to achieve the goals of expanding opportunity and remediation of past discrimination while, on the other hand, ameliorating the concerns over fairness and the exacerbation of in-group/out-group identification and conflict.

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5.35 PM

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N. N.

In this paper, I demonstrate how psychoneuroimmunology can be viewed as a form of boundedly rational information processing, much like the information processing that occurs in financial markets, on the whole correct but vulnerable to irrational “exuberance” as well as panics. The HBES presentation is meant as a survey of the many recent applications of PNI to social phenomenon and the various policy implications, culminating in a focus on the last of these applications. Just as the medical community can become a vector for harms, through iatrogenic illness, so too can the courts become sites of harm transmission. The social norm literature has already given a great deal of attention to how legal sanctions can cause actors to internalize the harms that victims experience but sanctions can also exacerbate the harm experienced by the victim. Just as diagnosis can be the source of the illness in a medical context, so too can legal definition of harm give rise to painful effects. It may be easy to see applications in areas such as sexual harassment, but there is also evidence that social construction is at work in such medically objective harms as whiplash. Studies have shown that the system of compensation, whether tort, workmen’s compensation, or no-fault insurance has a systematic effect on the severity of physical injury and length of time to recovery. When courts take into consideration their role in the social construction of harm, determining optimal sanctions becomes much more difficult, giving rise to multiple equilibria.

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5.55 PM

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MATHEMATICAL THINKING AND HUMAN NATURE: CONSONANCE AND CONFLICT

From evolutionary psychology I take the notion of human nature as “the evolved, reliably developing, species-typical computational and neural architecture of the human mind and brain.” (Cosmides & Tooby, 2000.) From mathematics education I take the method of didactical phenomenology (Freudenthal, 1983) - an analysis of mathematical concepts and their historical and psychological origins. Putting the two together, we observe a bi-polar phenomenon: On the one hand, many advanced mathematical concepts originate in human nature; on the other hand, the modern versions of these concepts clash with their “natural” origins. It appears that in the cultural evolution of modern mathematics, achieving more power and rigor requires going against human nature. This clash can explain some widespread and persistent conceptual errors among math learners. For example, the function concept (at least in its algebraic -- as opposed to analytic -- conception) seems to be rooted in children’s tendency to view the world in terms of objects and the operations they afford. Since an operation on an object is usually meant to induce some change, it is natural to believe, when learning about functions, that *a function changes its input*. This prediction is borne out both by the history of the function concept (Kleiner, 1989), and by a recent preliminary study with adult students (Paz, 2003). However, since in its modern incarnation, a function

doesn't change anything (except perhaps in the mathematician's imagination), the above clash leads the students to errors, as is shown by the same study.

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6.15 PM

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MAJOR CORRELATES OF CRIME THROUGH AN EVOLUTIONARY LENS

A large number of correlates of criminal behavior have been well described, but poorly explained, by traditional sociological criminology. Attempts at explaining major correlates of criminality have been limited to ad hoc appeals to a variety of "social facts." There is no metatheory in contemporary criminology that allows it to discover and organize patterns of behavior across the correlates it identifies. Darwinian theory can provide the metatheory criminologists need for the discovery of behavioral patterns they previously overlooked or were unknown to them. Selectionist thinking should also reveal commonalities among the correlates of criminal behavior thought by non-Darwinian criminologists to be separate phenomena. This paper examines the relationship between age, gender, sexuality, and family related variables to criminal activity through the lens of evolutionary psychology.

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Language and Speech, Chair: Clare Holden
Lecture Hall A, Saturday morning

10.20 AM

*David Putz (NYI)
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*WOMEN'S PREFERENCES FOR MEN'S VOICES VARY CYCLICALLY WITH CONCEPTION RISK
AND PREDICTED HORMONE LEVELS*

Fundamental frequency (F_0) is the vocal acoustic parameter closest to what is perceived as pitch. Men speak at a lower F_0 than do women, even controlling for body size. Although the developmental and anatomical reasons for this sex difference are known, the evolutionary reasons are not. By examining menstrual cycle variation in women's preferences for men's voices, the present study tests the hypothesis that female choice for good genes influenced the evolution of male F_0 . Results indicate that women's preferences for low male F_0 increase with conception risk over the ovulatory cycle. Moreover, low F_0 was preferred more within short-term, sexual (rather than long-term, committed) mating contexts and by women with high sociosexuality (interest in uncommitted sex). To gain insight into the proximate mechanisms underlying cyclic variation in women's preferences for male F_0 , this paper also explores relationships between predicted levels of six hormones (estimated on the basis of menstrual cycle information) and women's preferences for male F_0 . Preferences for low F_0 decreased with predicted progesterone levels and increased with predicted ratios of estradiol to progesterone. These results suggest that an association between low male F_0 and heritable fitness led to the evolution of the observed (probably progesterone- and estradiol-mediated) patterns in women's F_0 preferences—patterns that likely influenced the evolution of low F_0 in men.

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10.40 AM

Greg Bryant
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THE FUNCTIONAL ORGANIZATION OF VOCAL PHYSIOLOGY FOR PITCH PRODUCTION

In speech communication, pitch (the perceptual correlate of fundamental frequency) performs multiple functions. Speakers systematically produce pitch for affective expression, to emphasize lexical meaning, to communicate intentional information, and possibly for syntactic disambiguation. The way pitch is used to clarify linguistic meaning is different than the way it is used to convey emotional information. There is vocal physiology evidence that implicates at least two muscle systems for pitch control. Vocal fold musculature appears to be functionally organized to accommodate simultaneous pitch movements in speech related to linguistic information and affective expression. There is complementary neuropsychological data that suggest there are specialized systems for processing different types of pitch information. I will discuss this evidence and propose an evolutionary approach to pitch production.

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11.00 AM

Hajime Yamauchi
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BALDWINIAN NICHE CONSTRUCTION- A NEW PERSPECTIVE ON LANGUAGE EVOLUTION

Recently the neglected evolutionary process of the Baldwin effect has been widely acknowledged. Especially in the field of language evolution, the Baldwin effect has been expected to salvage the long-lasting deadlocked situation of modern linguistics: i.e., it may shed light on the relationship between environment and innateness in the formation of language.

However, as intense research of this evolutionary theory goes on, certain robust difficulties have become apparent. The most significant problem is genotype-phenotype correlation. By computer simulations, both Yamauchi and Mayley show that for the Baldwin effect to work legitimately, correlation between genotypes and phenotypes is the most essential underpinning. In this mechanism, phenocopies have to be genetically closer to the innately predisposed genotype. Unfortunately, as a highly complex cognitive ability, the possibility that this type of genotype-phenotype correlation exists in the domain of linguistic ability is vanishingly small.

In this presentation, we propose a new type of mechanism, called Baldwinian Niche Construction (BNC), that has a rich explanatory power and can potentially overcome this bewildering problem of the Baldwin effect. Different from the conventional mechanism of the Baldwin effect, by creating a new niche, learning discloses a previously hidden genetic variance on which the Baldwin "canalizing" effect can take place as a case of exaptation process. It requires no genetic modification in a given genepool. There is even no need that genes responsible for learning occupy the same loci as genes for the innate linguistic knowledge.

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11.20 AM

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THE EVOLUTION OF BANTU LANGUAGES: TREES AND NETWORK MODELS

Recently, we have seen phylogenetic methods applied to construct language trees for Indo-European, Austronesian and Bantu languages. This is possible because evolutionary processes in species, genes and languages are similar, featuring branching and divergence. However, how tree-like linguistic evolution is remains highly contentious. Languages appear to fit tree models at least as well as biological taxa. But we also know that linguistic elements are borrowed or copied between neighbouring languages, in a process analogous to gene flow between species. Tree models force us to interpret the data in a maximally tree-like way, which may not reflect borrowing realistically. In contrast, network models do not force linguistic relationships to be branching, instead showing conflict or reticulation if it is present in the data. In this analysis, the program NeighborNet was used to explore relationships between 95 Bantu languages using a network model that does not force the data into a tree. Results suggest that Bantu languages had significant borrowing (or dialect chains) during their early prehistory, but later Bantu linguistic evolution was predominantly tree-like. Another way to approach phylogenetic uncertainty is to use Markov Chain Monte Carlo (MCMC) and Bayesian methods to construct a sample of possible trees, in which the frequency of any clade in the sample is equivalent to its probability. A sample of Bantu language trees was constructed, which is described here. This enables any lingering uncertainty in the tree to be incorporated into any subsequent analysis.

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11.40 AM

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PHYLOGENETIC ANALYSIS OF MARITAL COMPOSITION AND MODE OF MARRIAGE IN THE INDO-EUROPEAN LANGUAGE FAMILY

Social anthropologists have long pointed out the association of marital composition (monogamy or polygyny) and mode of marriage (dowry or bridewealth) in humans: bridewealth is in fact usually observed in polygynous societies and dowry in monogamous ones (Goody & Tambiah, 1973; Goody, Thirsk & Thompson, 1976). Human behavioural ecologists have suggested this association results from correlated evolution of monogamy and dowry and of polygyny and bridewealth, yet in their cross-cultural studies they have failed to fully take into account the non-independence of cultures (Galton's problem): closely related societies are in fact more likely to be similar by way of the hierarchical mode of descent of human cultures. The distribution pattern of the traits - bridewealth is found mainly in Africa and dowry in Eurasia - indicates that the association could indeed be due to common ancestry.

As proposed by Mace & Pagel (1994), phylogenetic comparative methods developed in evolutionary biology can be used to control for Galton's problem by reducing the quantitative analysis to independent instances of cultural change. I have analysed the distribution of the traits in the Indo-European language family using phylogenetic comparative methods that take into account uncertainty in the tree (Pagel, 1994, 1997, 1999) on linguistic data derived from the comparative Indo-European corpus (Dyen, Kruskal & Black, 1992; Gray & Atkinson, 2003), with data on marital composition and mode of marriage from the ethnographic literature. Results strongly support the hypothesis of correlated evolution of monogamy and dowry and of polygyny and bridewealth.

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12.00 PM

Nathalie Gontier (NYI)

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LANGUAGE AND GENES - WOULD SOMEONE PLEASE PULL THE BREAKS

The affected members of the British KE family have a point mutation in their FOXP2 gene, and this gene is presumably responsible for their SLI.

One cannot draw conclusions about SLI in general, based on the etiology of KE (there have been reports on correlations between SLI and chromosome 16 and 19, but only the KE have a point mutation on their FOXP2 gene and they have been taught a sign system).

1. The FOXP2 is investigated as being part of a larger group of fox genes and transcription factors.
2. There are 2 different positions one can take involving the mutations the FOXP2 gene underwent. Depending on the position taken, it has new consequences: the fact that it has been stable for millions of years and suddenly underwent 2 amino acid substitutions, can imply that this gene helps to enhance the reproductive success of its carriers, and hence, got spread throughout the population, and got fixed, Enard 2000. Another possibility, is that the FOXP2 gene, got positively selected for millions of years ago, got fixed and that natural selection tried, to maintain this stability. These constraints loosened, the gene was able to mutate, and drift caused the gene to mutate twice, without their actually being an advantage or disadvantage for the carrier of that gene.
3. It will be investigated what a language gene looks like, what it should encode for and how it can evolve within evolution.
4. The relation between mirror systems and the FOXP2 gene gets looked into, thereby pointing at new directions that need further research.

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Cooperation and Punishment (Symposium), Chair: Michael Price
Lecture Hall B, Saturday morning

COOPERATION AND PUNISHMENT

Complex cooperation among non-kin is an important and contentious problem in behavioral biology, and one that has attracted the attention of researchers from many different fields. The problem is inherently interdisciplinary because it is so foundational: most human social behavior, especially the kinds that social scientists like to study, is embedded in a context of complex cooperation. The eclectic group of evolutionists studying complex cooperation does not always agree about how to approach the problem, but often does agree, thankfully, about the issues on which we need to focus in order to make progress. Many of these interrelated issues will be discussed in this symposium.

One of these issues is punishment, which, if administered judiciously, can be particularly effective in motivating contributions from would-be defectors, making it uniquely important as both a reason to cooperate and as a kind of cooperation in itself. In what sorts of social situations are people motivated to punish? Is punishment in cooperative contexts “altruistic?” What kinds of selection pressures might account for the impulse to punish? A second issue is levels of selection. Do the design features of human cooperativeness betray an evolutionary history of biological group selection? Of cultural group selection or gene/culture co-evolution? Or can cooperativeness be understood in terms of standard individual-level selection? A third issue is the role of emotions in promoting cooperative behavior, particularly the “angry” ones which seem to motivate punishment, and the “guilty” ones which seem to motivate reparative cooperativeness. What are the origins of these emotions, and how do they influence behavior? Could the cognitive systems producing these emotions be adaptations, and if so, what adaptive problems were they designed to solve?

These are some of the topics that will be addressed in this symposium, in hopes of making progress towards the ultimate goal of a conceptually integrated understanding of complex cooperation that will be applicable and useful throughout the social and behavioral sciences.

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10.20 AM

Michael Price (**PR**)

Indiana University Workshop in Political Theory and Policy Analysis, Bloomington, IN, USA;
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MONITORING, REPUTATION, AND "GREEN BEARD" COOPERATION IN A SHUAR WORKGROUP

In a collective action (CA) which produces a public good, cooperators risk being at a fitness disadvantage compared to free riders. However, they could have overcome this disadvantage in ancestral environments through "green beard" cooperation, i.e., by assessing co-participant cooperativeness and cooperating preferentially with other cooperators. This assessment could have been based on (1) information acquired through monitoring (direct observation of cooperative behavior), and (2) reputational information. This theory predicts that CA participants should monitor accurately, and that those perceived as cooperating more should have better reputations. These predictions were confirmed in a study of the real-life CAs of Shuar hunter-horticulturalists. Participants monitored accurately: they distinguished "intentional" non-cooperators (who could have cooperated but chose not to) from "accidental" non-cooperators (who were unable to cooperate), and their perceptions of co-participant cooperativeness accurately reflected more objective measures of this cooperativeness. And, perceived cooperators had better reputations, i.e., were respected more by co-participants. CA organizers in any sociocultural context might benefit from considering that monitoring and cooperation-based respect allocation not only may have been integral to adaptive CA participation in the ancestral past, but may also promote successful CA in the present.

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10.40 AM

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IS GUILT AN ADAPTATION FOR MAINTAINING COOPERATIVE RELATIONSHIPS?

Researchers have classified guilt as a "universal emotion", which is experienced when an individual perceives that he/she has injured a valued relationship partner. Causing such an injury might result in lasting damage to an important cooperative relationship, which could have entailed significant fitness costs in ancestral environments. It has been suggested that guilt involves the recalibration of regulatory variables considered when making decisions about trade-offs in welfare between the self and others, based on new information about the consequences of one's actions. Individuals who experienced guilt (and the associated modification of decision rules) would have been less likely to repeatedly injure relationship partners, and they would have had more success in maintaining beneficial cooperative relationships. Empirical data supporting the hypothesis that guilt involves the processing of new information regarding the consequences of one's behavior for others will be reviewed. A variety of experimental studies have indicated that those who experience guilt after injuring another are more likely to behave altruistically or cooperatively in subsequent interactions, and these will be summarized. Finally, a research program for the investigation of the structure and function of the cognitive system producing guilt will be outlined.

Keywords: cooperation, altruism, guilt

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11.00 AM

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DO ALTRUISTIC PUNISHERS RECEIVE SOCIAL BENEFITS? TESTING FOR WITHIN-GROUP BENEFITS

Recent theoretical and experimental work has shown that altruistic behaviour could have evolved and been maintained in populations if there are opportunities to punish free-riders, and that people are willing to pay to punish free-riders. However, non-punishers benefit when free-riders are sanctioned, making the provision of such sanctions an altruistic act itself. Some theorists discussing the evolution of altruistic punishment have focused on the differential survival of groups to explain why people possess punitive sentiments. Here I present a series of experiments bearing on an alternate hypothesis that punishers gain within-group social benefits for punishing. Undergraduate participants played cooperative group games in which there were free-riders, and they were given the opportunity to sanction free-riders. Participants did rate punishers as being more trustworthy, group-focused and worthy of respect than non-punishers. I also tested whether punishers receive monetary benefits in subsequent cooperative games, and these findings will be discussed in relation to the current debate over whether one should invoke group-selection models to explain the existence of altruism and altruistic punishment.

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11.20 AM

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ALTRUISTIC PUNISHMENT AS GROUP-BASED COOPERATION

One of the most crucial features of human society is the pervasiveness of cooperation in social and economic exchanges. It is also widely known that such cooperative behavior is likely to be directed toward in-group members. We propose that the group-based nature of cooperation includes punishment behavior. The goal of punishment behavior is to maintain cooperation within a system of social exchanges and thus it is directed to members of an exchange system. Since social exchanges often take place within groups, we predict that punishment is directed toward in-group members who are found to be non-cooperators. We conducted a gift giving game experiment with third party punishment, which is purely altruistic behavior because punishment of antisocial individuals entails a cost and generates no beneficial consequences to the punisher himself. The results of the experiment with 90 participants support this hypothesis: Subjects who reciprocate in-group members in a gift giving game punish non-cooperative in-group members more severely than they punish non-cooperative out-group members. Additionally, post-experimental questionnaire data show that negative emotions toward cheaters are related to the punishment level of in-group members but are not related to the punishment level of out-group members. Our findings that altruistic punishment is mostly directed toward in-group members rather than out-group members suggest that the group-based nature of cooperation is extended to punishment as second-order cooperation.

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11.40 AM

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A CROSS-CULTURAL STUDY OF EMOTIONS IN SOCIAL DILEMMAS

Recent neurobiological research emphasizes the importance of emotions in economic decision-making. In particular, it has been argued that emotions can explain negative reciprocity. As emotions are partly

shaped by humans' social environment, it is interesting to investigate the potential impact of the socio-economic background on humans' emotional arousal in a social dilemma situation. We therefore analyze the self-reported emotional response on cooperating and defecting partners among subjects in Switzerland, Germany, Byelorussia and Russia. Over all, 1038 subjects took part in one-shot- public goods games with and without punishment and indicated in a post-experimental questionnaire (adapted from Bosman and van Winden, Economic Journal 2002) the intensity of the perceived emotions with regard to their partners' decision. We find different intensities of self-perceived emotions against free riders and cooperators between our Western and Eastern subjects. Moreover, in the experiments with punishment, we find that actual punishment and the reported emotions are strongly correlated. Yet, we also do find cross-societal differences in these correlations.

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Addictive Behavior (Symposium), Chair: David B. Newlin
Lecture Hall C, Saturday morning

EVOLUTIONARY APPROACHES TO ADDICTIVE BEHAVIOR

Addictive disorders—principally substance abuse and dependence, gambling, and eating disorders—are far and away the most prevalent psychiatric diseases. They are also among the most difficult to treat, with very high relapse rates and few pharmacotherapies that are currently available. Fresh approaches to the etiologies of these disorders may facilitate effective prevention and intervention. This symposium presents innovative theoretical views of addictive disorders from an evolutionary perspective. Using a macaque model, Dr. Dee Higley emphasizes the close associations of aggressiveness and impulsivity—which are adaptive in some situations—drinking disorders, and serotonergic neuropharmacology and genetics. In relation to eating disorders, Dr. Shan Guisinger presents a highly innovative view of anorexia nervosa as an adaptation to famine—a common occurrence in both the ancestral environment and today—in which foraging groups are empowered to flee to more fortuitous environments despite starvation. Dr. David Newlin presents the SPFit theory of addictive behaviors in which drugs of abuse artificially and transiently exaggerate our self-perceived sense of survival ability (power and omnipotence) and reproductive fitness (personal and sexual attractiveness). He proposes that survival and reproductive motivation underlie addictive behavior rather than “reward” and “reinforcement.” One theme that characterizes these theories is the importance of empowerment—fundamental to the survival of all mammals. As Discussant, Dr. Russell Gardner, Jr. will discuss the provocative issues raised in this symposium. Finally, Dr. James Andrew Thomson will lead an open, 20 minute audience discussion of the implications of evolutionary theory for clinical issues, ranging from prevention and community intervention to psychotherapy and other clinical treatments. In a young science such as this, it seems essential that basic theories and their empirical foundations lead to practical ways that the ideas are translated into clinical and community practice.

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*POTENTIAL ULTIMATE AND PROXIMAL VARIABLES CONTRIBUTING TO ALCOHOLISM:
A NONHUMAN PRIMATE MODEL*

While it is unlikely that genes evolved that specifically selected for alcoholism, it is not difficult to understand how a system that is oriented to maintaining caloric intake could function to motivate alcohol intake. At low concentrations, alcohol solutions are sweet and high in caloric intake. An important behavioral predictor of excessive alcohol consumption in both humans and rhesus monkeys is the

propensity toward impulsivity. Alcoholics have difficulty inhibiting their urge to drink and once they begin drinking they have difficulty terminating a bout. Differences in impulse control, however, at times and in some settings have advantageous features. Given our close phylogenetic relatedness, non-human primates are seen as an ideal model for alcoholism. Indeed, many studies in both humans and rhesus macaques show relationships between excessive alcohol consumption, aggression and serotonergic function, as measured by concentrations of the principal metabolite of serotonin, 5-hydroxyindoleacetic acid in the cerebrospinal fluid. Molecular genetics show that differences in alcohol intake and impulsivity are modulated by genetic differences in the serotonin system and other systems that regulate CNS serotonin functioning. Integrating behavioral and neuroendocrine data from captive and semi free-ranging rhesus macaques, we advance that benefits derived from impulsive and aggressive behaviors in some contexts might indirectly contribute to the maintenance of traits involved in alcoholism and excessive alcohol intake.

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10.40 AM

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ADAPTATIONS TO FLEE FROM FAMINE IN ANOREXIA NERVOSA MAY BE ADDICTIVE

This paper explores the contributions of evolutionary adaptations to flee from famine to the addictive nature anorexia nervosa (AN). People with AN ignore food, deny illness, and often exercise excessively although they are starving. AN is generally seen as a psychogenic illness that develops in vulnerable young women when culture idealizes a very thin female body or when parents are excessively controlling. The adapted to flee famine hypothesis (AFFH) proposes that these symptoms may be due to adaptations that empowered starving foragers to move away from food depleted areas. These adaptations are now triggered in genetically susceptible individuals who lose over 15% of their normal body weight for any reason. Neuroendocrine functions suppress hunger and increase energy, while cortical mechanisms promote the belief that he or she is not too thin to undertake a desperate journey. People with anorexia have abundant energy and commonly feel they are powerful, even grandiose about being "in control" of their appetites. These behaviors and cognitions--which would have facilitated migration in the past--now make anorexia addictive. As they gain weight the anorexic adaptations lose their hold on the individual and patients develop symptoms of ravenous hunger, lethargy and despair that are normal for the starving. The loss of feelings of well-being, grandiosity and sense of control is distressing and contributes to recidivism.

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11.00 AM

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THE SELF-PERCEIVED SURVIVAL ABILITY AND REPRODUCTIVE FITNESS (SPFIT) THEORY OF SUBSTANCE USE DISORDERS: CONTROL THEORY, PSYCHOBIOLOGICAL DRUG RESPONSES, AND THE END OF "REWARD", "REINFORCEMENT", AND "EUPHORIA"

A new theory of substance use disorders is proposed—the SPFit theory—that is based on evolutionary biology and adaptive systems. Self-perceived survival ability and reproductive fitness (SPFit) is proposed as a human psychobiological construct that prioritizes and organizes (i.e., motivates) behavior, but is highly vulnerable to temporary, artificial inflation by drugs of abuse. Autoshaaping/sign-tracking/feature positive phenomena are proposed to underlie the development of craving and expectations about drugs as the individual learns that abused drugs will easily and reliably inflate SPFit. The cortico-mesolimbic dopamine system and its modulating interconnections are viewed as the biological substrate of SPFit; it is proposed to be a survival and reproductive motivation system rather than a reward center or reward pathway. We apply control theory to this theory of addictive behavior in terms of psychobiological drug

responses. Finally, we argue that the concepts of “reward” and “reinforcement” are unnecessary and misleading when viewed from this evolutionary perspective.

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Self and ToM (Symposium), Chair: Farah Focquaert
Lecture Hall D, Saturday morning

SELF & THEORY OF MIND

This session will deal with the differences and resemblances between 'self' and Theory of Mind in human and non-human primates, or with one of these topics in particular. Different aspects and component parts of human and non-human 'self' and ToM will be investigated from an evolutionary, cognitive, developmental, neurological, and psychological perspective. When talking about 'self' and ToM, 'conscious' and 'unconscious' aspects (LeDoux, 2003) can be separate objects of research and can each be valuable in defining the cognitive, neurological underpinnings of both systems and in determining their possible adaptive function. The 'self', and its conscious aspect self-awareness, refers to the kind of 'I' human and non-human primates, and possibly other creatures such as dolphins, dogs and parrots, may possess. As Damasio (2003) puts it, 'self' always implies a *reference*, it implies an 'agent' to whom the 'I' refers to. ToM refers to the ability to read one's own and others' minds, to attribute mental states to self and others in order to predict behaviour. ToM is often viewed as a subcomponent of social or 'machiavellian' intelligence. Its adaptive function might be the ability to read the minds of possible competitors or co-operators. Research on the possible fitness benefits of having a 'self' or self-awareness is less readily available. What fitness benefits does self-awareness bring? (Happé, 2003) A lot more is to be known about human and non-human 'self' and ToM before this and other evolutionary important questions can be answered. This session explores different aspects and component parts of human and non-human 'self' and ToM, hopefully to obtain a better understanding of their possible adaptive function. Kinesthetic-visual matching, pretense, false belief, self/other knowledge, human social cognition, emotional chimpanzees, meta-representational abilities, autism, neural architecture dedicated to eye detection, face recognition, trading behaviours and biological market theory will be among the topics taken under consideration with respect to 'self' and ToM.

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10.20 AM

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EMOTIONAL CHIMPANZEES, DOMESTICATED FOXES, AND THE EVOLUTION OF HUMAN SOCIAL COGNITION

Darwin's greatest difficulty was in explaining the evolution of human intelligence. One hypothesis is that unique social problem solving skills may explain much of what is unique about our species' phenotype including language and culture. Comparative experiments will be presented from children, apes, monkeys and various canid species that suggest that any changes in human social cognition (i.e. Theory of Mind) were likely preceded by changes in emotional reactivity. The implication of these findings is that human “cognitive” evolution cannot be understood without knowledge of the evolution of our species' unique temperament.

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THE SELF AND OTHER MINDS, KINESTHETIC-VISUAL MATCHING, AND CHILDREN'S THINKING ABOUT PRETENSE AND FALSE BELIEF

People commonly interpret their own and others' behavior psychologically. They use words demarcated as depicting or naming mental states to explain or understand behavior. Very little evidence is required for people to attribute mental states of thinking and feeling to others. Mental descriptions appear to result from an attempt to provide causes for another's behavior in context, and need not indicate elaborate attribution of internal experiences. I propose that these mental descriptions develop from at least two sources. One source is the child's implicit recognition of similarity in internal states between self and other because of kinesthetic-visual matching, which allows for generalized imitation, mirror-self-recognition, recognition of being imitated, and the possibility of empathy. Another source is the development of language and norms for interpretation, which includes the child's interaction with individuals who use the same terms to describe both the child's own behavior-in-context (which is correlated with the child's internal experience) and others' similar behavior-in-context. I suggest that the typical use of mental terms to describe others in adult humans only infrequently involves thoughts of their experiences, and that young children even less frequently are explicitly concerned with the mental states of others when using mental vocabulary. I describe experiments examining 3- to 6-year-old children's understanding of their own and others' pretenses and false beliefs to show that children interpret evidence about self and other differently: they more frequently misattribute pretense to others than to themselves, and more frequently misattribute beliefs to themselves than to others.

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11.00 AM

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//MINE - YOU/YOURS: NOTIONS OF SELF AND OTHER REQUIRED FOR THE OPERATION OF A BIOLOGICAL MARKET IN CHIMPANZEES PAN TROGLODYTES

Chimpanzees display trading behaviours related, but not restricted, to food, grooming, sex, play and alliance formation. This paper will argue that there are at least four identifiable "things" in each transaction - self, other, self's commodity and other's commodity. It will then posit that the traders in such commodities require an awareness of both self/nonself and mine/not mine to engage in these transactions.

In a complex and dynamic social environment it is conceivable that a Theory of Mind or Machiavellian system is in play and that this can be tested by means of a composite of Biological Market Theory and Relational Contract Theory.

Unlike traditional game theories Biological Market concepts are reliant on both past events and an awareness of future possible events. This awareness of the future also engages concepts of theory of mind. Relational Contract Theory posits that it is in the interests of trading partners within an ongoing relationship to maintain it despite temporary disadvantages to one or other. This again militates in favour of a "self/non self" and Theory of Mind position rather than a series of blind, discrete interactions.

This paper will draw upon the author's work with the chimpanzees of Regent's Park Zoo, London and Chester Zoo in the UK.

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11.20 AM

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ON THE ADAPTIVE IMPORTANCE OF A 'REPRESENTATIONAL MIND' FOR SELF AND TOM

What is special about the human SELF and human ToM? I will argue that one of the adaptive differences between human and non-human primates, when talking about their 'self' and ToM, lies in their different representational abilities. Using Perner's (1991) 'representational theory of mind' as framework, I will argue that humans possess a 'representational mind' that allows them to have a *unique kind of access* to their own mental states and those of others. This is not to say that the great apes do not have access to their mental states. I will argue that the great apes, 2 year old children and possibly our common ancestor, have the ability to form secondary representations or mental models of the world (Suddendorf & Whiten, 2001), but that they lack meta-representational abilities (understanding representations as representations), which I will claim are vital to the human sense of 'self' and human ToM. I will defend that only humans have the cognitive machinery to represent mental states as mental states. This special kind of introspective awareness is lacking in 2 year old children, the great apes, our common ancestor and is probably impaired in people with autism (Happé, 2003). This ability allows humans to know and predict how they and others will behave before any actions are taken. Combined with our ability for 'mental time travel' (Suddendorf & Corballis, 1997), humans can modify their current behaviour with respect to distant goals.

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Evolutionary Cognitive Neuroscience (Symposium), Chair: Julian Paul Keenan
Audimax, Saturday afternoon

EVOLUTIONARY COGNITIVE NEUROSCIENCE: NEUROIMAGING AND SELF/OTHER INTERACTIONS

Evolutionary Cognitive Neuroscience is an emerging discipline that combines the methods of cognitive neuroscience with the theoretical guidance of evolutionary theory. In this symposium four papers will be presented by up and coming leaders in this newly emerging discipline. Maryann Fisher and colleagues will present recent evidence demonstrating specific neural correlates associated with facial attractiveness. Her and her colleagues have employed fMRI to investigate how the brain reacts to faces as a function of individual ratings of facial attractiveness. Julian Keenan will present data from his lab in collaboration with Sarah Malcolm which demonstrates a right lateralized dominance for deception detection using Transcranial Magnetic Stimulation. These data build on an already growing literature demonstrating right hemisphere bias (along with midline structures) for processing information about the self and other. Georg Northoff will expand upon the evolutionary role of the cortical midline in terms of the self. His use of various imaging techniques and a number of different populations (e.g., catatonic schizophrenics) will be presented. Steven Platek and colleagues expand upon recent behavioral evidence showing a sex difference in reaction to children's faces. Using event-related fMRI they have discovered how the brain processes facial resemblance and what parts of the brain are involved in the sex difference in reactions to children's faces. These data collectively add to a growing literature demonstrating specific evolved modularity of functioning in the human brain that appears to be a result of our evolutionary history.

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1.30 PM

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*THEORY OF MIND AND SELF-AWARENESS: THE EVOLUTIONARY ROLE OF DECEPTION
AND THE RIGHT HEMISPHERE*

There appear to be two consistent findings regarding both self-awareness (SA) and theory of mind (TOM). First, the cortical midline structures appear to play a role in the maintenance of basic self-awareness. Second, the right fronto-parietal regions are implicated in the involvement of self/other distinctions as well as the recognition and continuity of the self. Furthermore, the evaluation of another's mental state appears to engage elements of the same midline/right fronto-parietal network. It has been suggested by us and others (e.g., Gallup, 1982) that the true advantage of SA and TOM may be found in deception. Successful intentional deception is dependent upon, at least in part, basic TOM abilities. We therefore investigated the neural correlates of deception and its relation to SA and TOM. In the first series of experiments, it was found that there was a significant correlation between TOM, SA and deception abilities. Specifically, increased TOM and SA abilities were correlated with increased deception detection scores. Second, deception detection was found to be related to right hemisphere functioning. We again tested undergraduate students with a lateralized deception detection task. True and false statements were played to both the left and right ears. It was found that deception detection was significantly increased when statements were played to the left ear (right hemisphere). Finally, we found via Transcranial Magnetic Stimulation (TMS) that cortical activity was increased in the right hemisphere during deception detection. These data may help to understand the role of the right hemisphere in terms of evolution.

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*WHOSE YOUR DADDY? SEX DIFFERENCES IN NEURAL CORRELATES OF PATERNAL
RESEMBLANCE*

Detection of genetic relatedness (i.e. kinship) impacts the social, parental, and sexual behaviour of many species. In humans, self-referent phenotype matching via detection of facial resemblance may indicate kinship. For example, faces that resemble us are perceived as more trustworthy and attractive. Sex differences in reactions to facial resemblance have also been demonstrated when viewing children's faces and are consistent with evolutionary theory suggesting that facial resemblance might serve as a paternity cue. Using event-related functional magnetic resonance imaging (er-fMRI), we show that specific regions of the brain are implicated in processing facial resemblance. Consistent with parental investment theory and theories of sexual selection, males had significantly greater cortical activity in response to children's faces that resembled them when compared to females. There were no sex differences in response to faces that did not resemble subjects. These data suggest natural selection crafted a sexually differentiated neuro-sensory module dedicated to detection of facial resemblance that may serve as a paternity detection mechanism in males.

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THE REWARDING NATURE OF PERCEIVED FACIAL ATTRACTIVENESS

Recently, a number of neuroimaging studies have sought to determine the neural correlates of perceived facial attractiveness. The results have demonstrated that the evaluation of facial attractiveness involves several frontal and striatal regions that are known to mediate the perception of rewards and emotions. However, in none of those studies were participants asked to rate faces on attractiveness directly as they viewed them in the scanner. This fMRI study was conducted to address that issue, with the intention of determining whether the areas that are involved in direct assessment of faces would differ from those that have been implicated in indirect assessments. The results based on 29 subjects demonstrated that activation in left anterior frontal cortex and middle occipital gyrus covaried as a function of attractiveness ratings. This result demonstrates that direct and indirect assessments of facial attractiveness involve common areas. In addition, we conclude that the pattern of activation observed in the aforementioned structures in response to faces of varying attractiveness is a specific example of their more general role in evaluating reward-based stimuli that vary in emotional valence. Our discussion focuses on the rewarding nature of attractive faces, and the evolutionary ramifications of this pattern of activation.

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THE EVOLUTION OF SUBJECTIVE EXPERIENCE AND CORTICAL MIDLINE STRUCTURES

Subjective experience is a hallmark of mental states and consciousness. Though neuroscience has made exponential progress in the last decade, mental states and consciousness remain a mystery. There are a number of questions related to evolutionary neuroscience that need to be addressed. First, we can examine the true advantages of subjective experience (i.e., what benefits are related to having subjective experience?). These advantages must override the costs that incur on the individual. The second question revolves around neural correlates. Here, I argue that the brain shows a network of regions in the midline of the cortex, the so-called cortical midline structures, which are especially designed for generating subjective experience. As demonstrated in several imaging studies on emotional experience, cortical midline structures (CMS) and subjective experience show analogous properties. The content in subjective experience reflecting some events in our environment might be accounted for by the processing of goal-orientation in CMS. Since the hallmarks of subjective experience correspond to their neural properties, the CMS can be considered a suitable neural candidate for subjectivity. Therefore, it is possible that the CMS relates to sustaining an advantage in goal directed behaviour for an individual.

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Modelling the Evolution of Cooperation, Chair: Masanori Takezawa
Lecture Hall A, Saturday afternoon

1.30 PM

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*THE EVOLUTION OF HUMAN HELPING: CUTTING THE GORDIAN KNOT
AND REWEAVING THE STRANDS*

Many scholars taking an evolutionary perspective on altruism start with a conceptual definition: acts in which one individual incurs a (fitness) cost and provides a (fitness) benefit to another. This has led to a wealth of models, including inclusive fitness, direct and indirect reciprocity, mutualism, and psuedoreciprocity, explaining altruistic acts. These models have in turn yielded rich empirical and theoretical findings, often using game theory, when applied to humans and other animals. Many researchers have the goal of identifying the single mechanism that can account for helping, whether a strategy (e.g. tit-for-tat), a social process (e.g. reputation), or an individual difference characteristic (e.g. norm following).

In contrast to these approaches, the evolutionary explanation of human helping presented here reverses these assumptions: not only are multiple mechanisms needed to account for helping, but helping itself is not fruitfully conceptualized as unitary phenomenon (incurring a cost and providing a benefit). Using an empirically based taxonomy of human helping behaviors, the empirical findings presented in this paper demonstrate that different intrapersonal and interpersonal processes are differentially involved in different types of help. Furthermore, each mechanism (e.g. empathy, impulsivity, gratitude, social norms) has its own phylogenetic and ontogenetic trajectory, and each mechanism may have arisen in contexts other than helping and may have effects on domains other than helping (e.g. aggression, parenting, sexual selection). Responding to Hammerstein's (2003) call for a next step, this paper takes a bottom-up approach that reorients the evolutionary perspective and reweaves the strands of our understanding.

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1.50 PM

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*PUNISHMENT AND COOPERATION: WHAT LACKS IN EVOLUTIONARY GAME THEORETICAL
MODELS OF HUMAN COOPERATION?*

In many of evolutionary game theoretical models of human cooperation recently developed by anthropologists and economists, punishment is considered to play a central role for evolution of cooperation. Though these studies greatly deepened our understanding of the logic underlying human cooperation, it is not clear how well these models succeeded in capturing psychological mechanisms underlying punishment and cooperation.

In the study, we conducted seven behavioral game experiments as within-subject design and investigated how several forms of cooperation and punishment are related within an individual. The targets of the investigation were altruistic behavior (dictator game), reciprocal cooperation in a dyad (sequential prisoner's dilemma game), cooperation in a group (one-shot/repeated public good dilemmas), punishment in a dyad (ultimatum game), and punishment in a group (one-shot/repeated public good dilemmas and third-party punishment game). As was found in social psychological research on human cooperation, we found that these forms of cooperation are highly correlated each other; a person who makes an altruistic offer in the dictator game is likely to reciprocate and cooperate in the other games. On the other hand, we found much more complex patterns between these different forms of punishment and a tendency to cooperate in the above games. Implications for an evolutionary game theoretical model are discussed.

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2.10 PM

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*THE FUNCTION OF EXCHANGE: COMPARISON BETWEEN THE EFFECT OF EXPERIENCING
GENERALIZED EXCHANGE AND THAT OF EXPERIENCING RESTRICTED EXCHANGE ON
BEHAVIORS IN SOCIAL DILEMMAS*

Since Durkheim [1933] (1984), sociologists and anthropologists have long regarded solidarity as a solution to the problems of social order and social change. It has been argued that generalized exchange is one of the answers to this problem. More specifically, generalized exchange facilitates solidarity, while restricted exchange does not (e.g., Ekeh, 1974). We examined this argument in a controlled laboratory experiment that had three conditions: generalized exchange (GE), restricted reciprocal exchange (REC), and restricted negotiated exchange (NEG). One hundred and eighty students were assigned to each condition. They repeatedly engaged in one of the three types of exchange in groups consisting of six participants. Before and after the exchange session, they played a one-shot social dilemma game. Solidarity was measured by the cooperation rate in a social dilemma game before and after the exchange session. Results showed that participants in the GE and REC conditions increased their level of cooperation in a social dilemma game, while the cooperation rate after NEG condition did not increase. Further analysis showed that this difference was mediated by the increase in expectation of others' contribution to the group. These results suggest that solidarity was facilitated after GE and REC, but not after NEG. This finding in turn suggests that generalized exchange promotes solidarity, since it has the characteristics of reciprocal exchange rather than those of negotiated exchange.

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2.30 PM

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*EXPERIENCE VERSUS OBSERVATION: THE EVOLUTION OF DIRECT AND INDIRECT
RECIPROCITY*

Reciprocal altruism can take the form of direct reciprocity in which individuals help those who help them, and indirect reciprocity in which individuals help those who help others. Research on these mechanisms has so far been conducted separately. This is because it has focussed either on the repeated encounters that favour direct reciprocity, or on the conditions where it can be excluded (namely where individuals never meet again). However, human societies provide a range of intermediate conditions in which we might expect to find a mixture of direct and indirect mechanisms. In such societies, individuals can decide whether to cooperate based either on their own experience of a partner's behaviour (direct reciprocity) or on information gained by observing a partner's behaviour with others (indirect reciprocity). While observation provides additional information, it can also be less reliable than direct experience. Here we present a simulation model in which strategies of indirect reciprocity, such as image scoring, compete with their direct reciprocity analogues, and we show the conditions under which we might expect to find the different forms of reciprocal altruism.

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2.50 PM

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*HUMAN COOPERATION AS COURTSHIP DISPLAY: AN EMPIRICAL STUDY OF THE ROLE OF
PARTNER GENDER AND ATTRACTIVENESS IN COOPERATIVE DECISION-MAKING*

The recent literature on the evolution of human cooperation has focused largely on indirect reciprocity, in which individuals receive more by being more generous. However, this is just one way in which individuals might benefit from a generous reputation. This study explores the role of sexual selection in explaining cooperative behaviour. In a web-based experiment, participants were presented with photographs of four different partners, a highly attractive male, a less attractive male, a highly attractive female and a less attractive female. Participants played four different cooperative games (mutualism game, one-shot Prisoner's Dilemma game, two versions of the Dictator game) with each partner. The order of partners and games played was balanced. For the one-shot Prisoner's Dilemma game, participants were more likely to cooperate with more attractive opposite sex partners. For the Dictator games, all participants made higher offers to females than to males and similarly favoured highly attractive individuals over less attractive individuals. There was no effect of partner gender or attractiveness on cooperation in the mutualism game. The fact that subjects took into account partner gender and attractiveness in the Prisoner's Dilemma and Dictator games suggests that their cooperative decision making is based not on purely economic factors but also on their reputation among particular partners, such as potential mates.

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New Approaches to Facial Attractiveness, Chair: Horst Dieter Steklis
Lecture Hall B, Saturday afternoon

1.30 PM

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*EXPLORING THE APPLICATION OF HUMAN FACIAL FLUCTUATING ASYMMETRY METHODOLOGY
IN A GREAT APE*

In humans, fluctuating asymmetry (FA) in the face has been linked to a variety of measures, including health, longevity, attractiveness, and mate choice. As a result, we know more about mate selection criteria in humans than in other primates, including species where females may exercise mate choice. Gorilla females exercise mate choice by emigrating or by mating covertly in multi-male groups, both of which are common in mountain gorillas (*Gorilla beringei beringei*). Moreover, we have a 35 yr photographic and behavioral - demographic database for over a hundred individuals. Since the ape face, like that of humans, is critical in social communication, including mating, we adapted the methodology used for measuring human facial FA (Grammer and Thronhill, 1994) for use with suitable gorilla photographs. As with the human face, we were able to reliably measure dimensions in the upper and middle portions of the face, but facial hair and curvature of the jaw made measurements in the lower face unreliable. We validated the methodology through repeat measurements of the same individual from multiple photographs. We have reliable facial FA values for more than 70 individuals of varying ages, sex, and social rank. Here we will present results of exploratory analyses of the relationship between FA and social behavioral (copulation, dominance) and life history variables (e.g., longevity, fecundity). To our knowledge, this is the first application of this method to a non-human primate, and we believe that it holds great promise for understanding the comparative dynamics of mate selection.

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1.50 PM

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A NEW PERSPECTIVE ON THE EVOLUTION OF HUMAN SPECIFIC FACIAL TRAITS

Sympatric sexual speciation is the processes that leads to speciation in the absence of physical isolation. Field research and theoretical models demonstrate that partner choice can drive sympatric speciation, in particular, sister species evolve divergent sexual traits and are separated by assortative mating. We tested the possibility that evolution of the unique facial features of modern humans was driven by sympatric speciation in the late Pleistocene, when some populations of *Homo sapiens* lived in syntopy with *Homo neanderthalensis*. Our hypothesis states that human females preferred as sexual partners males whose faces were more different from *H. neanderthalensis* mean facial shape. This hypothesis has two predictions:

1. Male craniofacial shape is more distant to Neanderthal average shape than female craniofacial shape
2. The sapiens-neanderthal axis in morphometric shape influences the male-female axis in perceptual space.

We tested these predictions using both geometric morphometry analysis of crania and psychophysical tests on morphed faces. We found that:

1. Female skulls are closer than male skulls to the Neanderthal average shape in morphometric space.
2. Morphing an androgynous face to caricature sapiens-specific trait increases perceived masculinity.

Therefore, we suggest that human facial dimorphism is, at least partially, the result of disruptive sexual selection in late Pleistocene driven by sympatry in Europe and Middle-East of modern humans and *Homo neanderthalensis*. This hypothesis accounts for the otherwise puzzling observation that species-specific facial traits are more pronounced in the human male.

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2.10 PM

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SHAPE ANALYSIS OF FEMALE FACIAL ATTRACTIVENESS

Many previous studies have analysed the effects of averageness and femininity on female facial attractiveness. These studies have made use of composite or warped images.

In the present study we have applied geometric morphometry, a method for multivariate statistical analysis of shape, to characterise the shape components correlated with attractiveness in natural faces. Using a morphing programme, natural faces were overlaid with an averaged texture, forcing attractiveness ratings to be based on geometry exclusively. A high level of interrater reliability was recorded for attractiveness ratings of these facial stimuli (20 raters, Cronbach's $\alpha=.91$).

We then characterised a morphometric space (Kendall's shape space) by recording the position of 21 facial landmarks. In morphometric space, averageness is rigorously defined as shape distance (Procrustes's distance) of a natural face from the average female shape. Femininity can be measured as the norm of the orthogonal projection of a face on the axis defined by the position of the average male and the average female shapes in morphometric space.

Averageness and femininity were barely correlated with attractiveness ($r=.35$, $p=.047$ and $r=.34$, $p=.05$ respectively). A principal component approach (relative warp analysis) detected a single shape component with a high correlation with attractiveness ($r=.63$, $p<0.001$). This component is not statistically-associated with face sex. We conclude that shape components not associated with face sex are more important than femininity or averageness in determining attractiveness of natural faces. This finding calls into question the assumption that female attractiveness is correlated with activity of estrogenic hormones

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SEX-TYPICALITY AND ATTRACTIVENESS IN DYNAMIC STIMULI

Previous studies investigating the attractiveness of sex-typicality in male faces have produced mixed results. Some studies suggest that masculinity is attractive in male faces, consistent with “good genes” and other sexual selection theories. Other studies, however, have found preferences for feminine male faces, perhaps as a result of the negative personality characteristics attributed to masculine facial traits. In this experiment, we look at the relationship between naturally occurring variations in perceived facial masculinity and attractiveness in static and dynamic stimuli which display either neutral or positive expressions. Masculinity was associated with attractiveness only when males were moving and expressive. When stimuli were static and neutral in expression (i.e. as tested in most other studies of male facial attractiveness) only ratings of selflessness were associated with attractiveness. Selflessness ratings were significantly correlated with facial femininity in this condition. We hypothesize that, in dynamic stimuli, the combination of facial masculinity and positive expression may be optimally attractive because the positive personality traits displayed offset the negative stereotype normally associated with masculine features. These results emphasize the importance of using ecologically valid stimuli in studies of male facial attractiveness.

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WOMEN'S PITCH OF VOICE AND FACIAL-METRIC MASCULINITY CORRELATE: IMPLICATIONS FOR REPRODUCTIVE STRATEGY

Sex hormones play a key role in the organization of face shape and pitch of voice in women. Hence, face and voice characteristics may be interrelated. In turn these qualities may bear on attractiveness and mate-choice strategies. Therefore we examined the relationship between masculinity as measured from facial landmarks (facial-metric masculinity) and voice pitch (fundamental frequency) in women, and how these measures may relate to reproductive development and sexual behaviour. In young adults (18-24 years), we observed femininity of women's face shape was associated with higher pitch of voice. This suggests facial and vocal characteristics signal a common underlying quality. We found that masculine women reported earlier menarche, earlier 1st sexual intercourse, and having more sexual partners than feminine women. As femininity of women's faces and voices is preferred by men, masculine women may be less able to secure desirable males for long term relationships. To compensate, masculine women may enhance reproductive success by starting their reproductive careers early (potentially producing more offspring) and having more sexual partners (potentially increasing viability of some offspring).

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Development and Life-History, Chair: Ulrich Mueller
Lecture Hall C, Saturday afternoon

1.30 PM

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*DELAYED DISPERSAL IN HUMANS: EFFECTS OF FAMILY CIRCUMSTANCES
ON DISPERSAL TIMING*

In humans and numerous avian species, unlike most animals, dispersal from the natal family may not coincide with reproductive maturity. This presents an adaptive puzzle, since delaying dispersal typically delays reproduction. Ecological explanations for delayed dispersal in birds have been proposed and tested. Emlen (1995) suggested parallels between humans and birds with regard to the circumstances that influence dispersal timing. Previous work applied Emlen's model to humans using proxy measures of "Natal Territory Quality" (NTQ). Using two age-based cohorts from a longitudinal survey of U.S. families, I extract direct measures of NTQ to more rigorously test Emlen's prediction that higher NTQ leads to later dispersal. Focusing on three dispersal events (residential dispersal, marriage, and first reproduction) I test whether economic variables describing family of origin (NTQ) and local conditions influence dispersal age. I use linear regression and proportional hazards to elucidate the relationships between dispersal and NTQ. The various NTQ measures appear to have different influences on the three dispersal events, suggesting differential salience of the NTQ components for each type of dispersal. Specifically, in linear regressions, family income and local unemployment rate appear to influence the timing of residential dispersal; age at first reproduction is similarly influenced but additional variance can be explained by including parents' education. Timing of first marriage is not well explained by any variables, but local unemployment is significantly predictive. Males tended to experience all dispersal events earlier than females. Results of proportional hazards analysis, as well as implications for human family processes, will also be discussed.

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THE IMPACT OF PATRILOCALITY ON HUMAN SOCIAL BEHAVIOR

The existence of gender differences regarding friendship has generally been assumed. In this study we examine whether and how this difference can be confirmed in terms of an evolutionary approach to human behavior based on the concept of patrilocality (i.e. in order to avoid inbreeding, females leave their birth group when reaching sexual maturity to join another group). Since patrilocality applies to the great apes and is dominant in hunter-gatherer-societies, it is thought to have also been in human ancestors. We assume that behavioral adaptations due to patrilocality (seeking integration in a foreign group demands a high level of social activity) still operate in urban societies and thus, expect females to be the socially more active gender. Participants (70 men and 70 women, aged 22-35) filled in a questionnaire that included qualitative and quantitative information about their relationships with their best and close friends. The results confirm our expectations by showing a clear difference in friendships, men vs. women. This is expressed by number of friends, type of commitment and relevance of topics discussed with friends. The best friend, who is named by half of the participants, plays a special role: the gender differences are less pronounced. Despite the fact that living situations for men and women have become comparable, behavioral mechanisms which evolved in the context of patrilocality still seem to exist in urban societies.

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*A CHILD LATER IN LIFE IS NOT A LIFE PROLONGING EVENT. FINDINGS
FROM THE EUROPEAN ROYALTY (1683-1939)*

Statistical associations between late reproduction and female longevity lead several authors to speculate that a late child actually makes the mother's lifespan longer. The data base here includes all descendants of King George I of England (1660-1727) and his wife Sophie Dorothea (1667-1726), born in the royal dynasties in Europe up to 1939 (n=1672). In the era of British world supremacy, these descendants formed the supreme layer of the European aristocracy, in the course of the 19th century gradually generating all crowned heads in Europe. Novel in this study is the mobilisation of pedigree information. In pairs of full sisters (brothers), both surviving to 45 (50) years, both having at least one child, it is observed whether the sibling with the first – or last - child born later in life, also lived a longer life. In this design are controlled: socio-economic status; health; genetics; cohort; social support; infant mortality; environmental fluctuations. For women (not for men), age at first (not at last) birth and longevity were positively, number of children and longevity negatively associated. However, in the 157 pairs of sisters, and 189 pairs of brothers, late reproduction did not enhance the lifespan. Apparently neither a late first nor a late last birth was a life prolonging event. Conclusions for human life course research are discussed.

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SEX DIFFERENCES IN AGEING: WHY WOMEN LIVE LONGER

Attempts to test evolutionary theories of ageing in humans have focussed mainly on the disposable soma theory (DST) and derivatives thereof. This theory is premised on the life-history trade-off between the accumulation of reproductive potential (i.e. investment in somatic growth and maintenance) or exploiting that reproductive potential (i.e. investment in reproduction). Within this framework, studies have identified a number of correlates of human longevity, particularly female longevity. These include age at first and/or last reproduction, age at marriage, number of sons versus daughters, and amount of reproduction.

Although long and widely recognised, less systematic attention has been given to the sex difference in life expectancy. In humans, as in most mammals, females tend to outlive males. Around the world, the mean difference in life expectancy is 4.7 years but rises to as much as 13 years in some parts of the world. Using global data from 192 countries around the world, this paper examines a number of correlates of the sex difference in life expectancy. Specific attention is given to the hypothesis that differences in longevity are related to the degree of sex size dimorphism.

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THE SOCIOECOLOGY OF ADRENARCHE

Adrenarche, or the increased production of DHEAS by the adrenal gland prior to adolescence, is a distinctive element of human life history thought to be shared only with chimpanzees. Yet the function of adrenarche remains a mystery. Here I argue that increased DHEAS production at adrenarche is associated with increased social interaction outside the family as a stage in the development of human behavior.

Because adrenarche precedes puberty, changes in pre-pubertal behavior are largely independent of sexual motivation and pairbonding, and focused on non-kin more generally. It is well-known that during the juvenile phase from 9-11, children become less dependent on their parents for social support and begin to interact with adults and peers as part of same-sex groups with the larger social community, a distinctive element of human social structure. However, the continuing increase in DHEAS during adolescence and young adulthood suggests that the processes of brain maturation and social learning that DHEAS may promote are not confined to the juvenile phase, but continue along side the activational effects of gonadal steroids on the brain. Thus, DHEAS may act to mediate the impact of gonadal steroids on the development of aggression, sociality, and sexual behavior during adolescence. DHEAS can be converted into both testosterone and estrogen and acts at some of the same receptors in the brain. Thus the interaction of adrenal and gonadal steroids on the development of adolescent and young adult brains and resulting behavior remains a fascinating question for future research.

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Sex and Personality (Symposium), Chair: Aurelio José Figueredo
Lecture Hall D, Saturday afternoon

SEX AND PERSONALITY

There is a growing trend in evolutionary psychology towards the examination of factors regulating individual variation in sexual and reproductive strategies within sexes. Some of the factors identified are situational and environmental whereas others are permanent and stable individual difference traits which are largely heritable. This symposium includes four presentations in which the effects of various personality traits on individual differences in sexual strategy are examined. These individual differences in sexual strategy include participating in extra-pair copulations, assortative mating by personality traits, engaging in increased mate retention behaviors, and altering mate choices under varying conditions of risk. The individual difference traits hypothesized to drive this variation in sexual strategy within sexes include social dominance, the big five personality factors, negative affect or emotionality, and individual mate value. In all four of the studies reported, alternative hypotheses are also considered and tested.

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1.30 PM

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IS SOCIAL DOMINANCE A SEX-SPECIFIC STRATEGY FOR INFIDELITY?

The current study investigated personality, psychopathy and mating effort of 84 adults recruited from a large office setting who admitted infidelity whilst involved in another relationship. These were compared to individuals who had not been unfaithful. Measurement scales were reduced by principal components analysis to three general factors; social dominance, manipulateness, and openness. There was no sex difference in social dominance or openness. Males were higher on the manipulateness factor. There were no differences in the social dominance or openness factors for individuals admitting affairs compared to those who had not; males who admitted affairs were higher in social dominance. There was an interaction between sex and having had an affair (or not) for the social dominance, this indicated males who had committed infidelity were higher on the social dominance dimension than females who were also unfaithful, the reverse was the case for males and females who had not had affairs. Manipulateness predicted the number of affairs had and their emphasis on sexuality, whereas social dominance did not. These results suggest male and female infidelity is underpinned by differential personality types as well as differential sexual strategies.

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THE IDEAL ROMANTIC PARTNER PERSONALITY

Ample evidence supports both absolute (“consensual”) and relative (“assortative”) preferences for romantic partner personality in human mate choice. To pit these hypotheses against each other, we created the NEO-MATE, a translation of the NEO-FFI items from self-reports to desiderata in an ideal romantic partner, to assess romantic partner preferences. We administered the NEO-FFI after the NEO-MATE to a sample of University of Arizona undergraduates to prevent priming participants to match ideal romantic partner's personality to one's own. The bivariate correlations between self and ideal partner ratings on these factors were significant and substantial, indicating a tendency towards positive assortative mating on all personality factors, at least in the desired imaginary romantic partners. By subtracting the factor scores on self-rated personality factors from those of the ideal romantic partner factors, we also obtained difference scores indicating discrepancies between ratings of self and of ideal romantic partners. The mean difference scores for each factor, with the exception of Openness to Experience, differed significantly from zero. Respondents rated ideal romantic partners higher than themselves on Conscientiousness, Extraversion, and Agreeableness, and lower than themselves on Neuroticism. Results support at least aspirational positive assortative mating for all FFM factors, but also indicate a relatively invariant preference (across age and sex) for romantic partners with more Conscientiousness, Extraversion, Agreeableness, and less Neuroticism than oneself. The relations of these preferences to mate value, mating effort, and relationship satisfaction were also studied in addition to comparing the self, actual, and ideal romantic partners.

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NEGATIVE AFFECT, PERCEIVED MATE VALUES, AND MATE RETENTION BEHAVIORS

The Mate Value Inventory (MVI) was developed to measure the social exchange value of individuals as romantic or sexual partners. Previous studies (Kirsner, Figueredo & Jacobs, 2003) demonstrated that self-reported depressive symptoms correlate negatively with self-reports of the mate value of oneself as well as one's realistic and ideal short-term and long-term partners. The current study measured both depressive and anxious symptoms, which functioned as indicators of the latent construct named Negative Affect. In the most parsimonious model among several candidates, Negative affect predicted the latent construct, Mate Retention Behavior, of which there are three indicators: (1) the Mate Retention Tactics Scale assessed the use of instrumental behaviors toward one's partner to keep the partner from leaving an existing relationship, (2) the Sexual Threshold Scale measured the frequency with which respondents have engaged in sex in a variety of contexts during the past year, and (3) the Cumulative Sexual Frequency Scale measured how many times a participant has “had sex” with male and with female partners in his or her lifetime. Negative Affect was negatively related to the mate value of one's hypothetical partners, but partners' mate values did not significantly predict Mate Retention Behaviors. The author interprets this result to indicate that negative affect may increase one's efforts to retain existing partners in spite of the lower mate value expected among the partners of individuals high in depressive or anxious symptoms.

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FEMALE MATING PREFERENCE, NEGATIVE AFFECT, AND RISK ATTITUDES

Videotapes of young men, which had already been rated by multiple female undergraduates for general attractiveness, were shown to a second sample of female undergraduates in pairwise comparisons. Subjects were asked to decide which of each pair of young men they would prefer to try establishing a relationship with. The first rating stipulated that they had 100% chance of successfully establishing a relationship with either male. The subjects were then asked to re-evaluate their choices as the probability of acquiring the more desirable mate was reduced to zero, in 10 decrements of 10% each. Four pairs of men per subject were used for this analysis. Multiplying the previously rated mate value of each male with the probability of getting him, expected utilities were computed and compared at the switching point between the more attractive and the less attractive, but more attainable, mate. Based on prior studies indicating that individuals with Negative Affect tended to settle for lower mate value mates through a reduction in their own perceived mate value, it was predicted that Negative Affect would increase the difference in expected utilities between potential mates at the switching point. The effect of Negative Affect was thus theorized to be attributable to risk aversion in selecting higher value mates. It was theorized that only high mate value, high mating effort, and high risk propensity would counteract this hypothesized risk aversion. However, although Negative Affect did again reduce the perceived mate value of the subjects, none of these additional hypotheses were confirmed.

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Cultural Transmission, Chair: Ruth Mace
Audimax, Saturday afternoon

4.35 PM

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*LINKING CULTURAL EVOLUTION THEORY, EVOLUTIONARY PSYCHOLOGY,
AND THE ARCHAEOLOGICAL RECORD: A MODEL OF THE EVOLUTION OF PRESTIGE GOODS
AND INCREASING SOCIOPOLITICAL COMPLEXITY*

The emergence of social ranking and political hierarchy constituted a fundamental departure from the small, egalitarian group structure thought to characterize human societies for most of our species' history. Social ranking allowed other changes in social organization to occur, including economic specialization and intensification, which in turn supported the formation of novel social institutions, such as formalized governing bureaucracies, and standing armies. Explaining the origins of social ranking is therefore key to understanding the underlying structures of modern human societies, and the evolutionary processes that generated them. Different historical trajectories as shown by archaeological data suggest that a rise in long-distance trade of prestigious items often correlates with the emergence of social ranking. Costly signaling theory is used here to explain in part the desire for rare, expensive items that serve no "useful" function, and to investigate the role played by prestige goods in the evolution of political hierarchy. I suggest that prestige goods emerged as honest advertisement of personal success and skill level. However, with group selection for collective action and formalized leadership roles occurred, in this novel arena for social competition signal content changed and expanded to reflect leadership qualities. I will present a model describing the dynamics of prestige goods in egalitarian, transegalitarian, and hierarchical societies, respectively. This will be evaluated against a sequence of development of a prestige good economy and the emergence and elaboration of social ranking that occurred during the prehistoric period in the Andean highlands of South America.

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*THE UPTAKE OF MODERN CONTRACEPTION IN A GAMBIAN VILLAGE: THE SPREAD OF A
CULTURAL INNOVATION OVER 25 YEARS*

The life history of women in 4 neighbouring villages in rural Gambia has been collected over 50 years by the MRC. In 1975 a medical centre opened in one of the villages which supplied modern contraceptives, free of charge, to women who wished to use them. We collected data from over 700 married women on when they first started using modern contraceptives, if ever. Contraceptive use is now fairly prevalent but an ideal of a large family size remains and more than 50% of reproductive age women have not used contraceptives even after so many years of availability.

Using event history analysis, we examined determinants of time to first use of modern contraception for all women aged between 15 and 49, any time between 1975 and the time of the survey (2001). Cohort was by far the biggest effect. Women currently in their 20s were nearly 50 times more likely to start using contraceptives than were women who were of a similar age 25 years ago. Significant effects were found of village. Household wealth rank did not have a significant effect on rate of contraceptive uptake after village was taken into account. Parity did have a significant effect, with women with few children being less likely to use contraceptives. However effects of location and generation (or cohort) appear to be much stronger determinants of time to first use than the effects of family size, suggesting cultural transmission is very important in determining first use of modern contraceptives

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CULTURAL EVOLUTION IN LABORATORY MICROSOCIETIES

Experiments can contribute to understanding the basic processes of cultural evolution. We drew features from previous research in which small-scale traditions arose in the course of several laboratory generations. Groups of four participants chose by consensus between solving anagrams printed on red cards and on blue cards. Payoffs for the choices differed. After 12 min, the participant who had been in the experiment the longest was removed and replaced with a naïve person. These replacements, each of which marked the end of a generation, continued for 10–15 generations, at which time the day's session ended. Time-out duration, which determined whether the group earned more by choosing red or blue, and was fixed for a day's session, was varied across three conditions to equal 1, 2, or 3 min. The groups developed choice traditions that tended toward maximizing earnings. The stronger the dependence between choice and earnings, the stronger was the tradition. Once a choice tradition evolved, groups passed it on by instructing newcomers using some combination of accurate information, mythology, and coercion. Among verbal traditions, frequency of mythology varied directly with strength of the choice tradition. These methods may be applied to a variety of research questions.

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5.35 PM

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NATURALLY SELECTED COGNITIVE TRAITS, CULTURALLY SELECTED NICHEs, AND THE PROBLEM OF CASINO GAMBLING

In 2003, North American casinos grossed \$30 billion from slot machines alone, “more annually than McDonald’s, Wendy’s, Burger King and Starbucks combined” (Rivlin, 2004, p. 42). This suggests an important problem for those interested in evolution and human behavior: why do so many people choose to gamble given that the games have a built-in expected cost to the players? This paper argues that the answer depends in part on the interaction between naturally selected cognitive traits and a culturally selected niche which exploits these traits. The cognitive traits include, for example, a heightened capacity to identify patterns in nature and a readiness to learn associations between choices and outcomes. The culturally selected niche refers to the casino environment and the games offered within this environment. This niche is a product of the interaction between two groups: 1) the gamblers themselves, who select games according to their appeal across various dimensions (including the perceived opportunity to win money), and 2) members of the casino industry, who select games according to their profitability. This interaction has led to the development of games that are finely tuned to exploit otherwise adaptive cognitive traits. To support the argument, the paper considers the examples of two casino games, blackjack and slot machines, as they have evolved through the interaction between gamblers and casinos over the past several decades. Finally, the question will be considered as to why and to what extent environments are culturally selected that exploit, rather than aid, biologically adaptive cognitive traits?

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SOCIAL CONVENTIONS IN WILD CAPUCHIN MONKEYS: ZAHAVIAN BONDING RITUALS?

Most examples of social traditions in wild animal populations pertain to technology (i.e. food processing techniques). However, many if not most of the elements of human culture involve social conventions. The best documented examples of social conventions in wild animal populations come from wild white-faced capuchin monkeys, *Cebus capucinus*. In this study, my 10 collaborators and I studied 12 different social groups at 4 sites in Costa Rica, collecting over 35,000 hours of observation over a period of 14 years. We documented the innovations and transmission pathways of 5 putative bonding rituals: hand-sniffing, eyeball-poking, sucking of body parts, and 3 types of “games.” These rituals were specific to certain groups or cliques and generally had a “lifetime” of 7-10 years before they vanished from the group’s behavioral repertoire. Such behaviors are most commonly practiced by co-migrating males, adult male-juvenile male dyads, female kin dyads, and female-alpha male dyads. It is hypothesized that such social conventions are ideal for testing the quality of social bonds because they involve risk and discomfort, and often require extensive practice to coordinate the roles of the participants. The degree of enthusiasm expressed by the participants may inform the monkeys about the strength of their collaborative relationship. It is speculated that other species characterized by intensely cooperative long-term social relationships may also exhibit social conventions with similar design.

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CULTURAL TRANSMISSION FORCES IN SUPERNATURAL NICHE CONSTRUCTION

No one has yet integrated the framework of cultural transmission forces, e.g., conformist and prestige biases, into a model for the evolution of religion. I show how the niche construction of supernatural agents operates at both the individual and group levels to exert selective pressure consistent with the transmission heuristics. The case study of an Australian Aboriginal society illustrates how Dreamtime agents demand the repetition of ancestral rites and thereby reinforce conformist biases and cultural conservation. In parallel, ancestral spirits appear from time to time in dreams or visions to whisper a fresh idea. "Play the new song exactly like this," instructed a dead uncle in one man's dream. Hence a personified prestige bias leads the way to innovation; indeed, creativity is introduced into their system predominantly via the sanction of supernatural agency. Overall, this uniquely human variety of niche construction functions

to ennoble experience and retain tradition, which in turn prevents backsliding of the ratchet effect, and to fuel variation by implementing ideas derived from altered states such as dream or trance. Data from computational modeling is presented to support the predictions generated by this hypothesis.

I conclude by explaining the essential cognitive mechanism of supernatural niche construction: the over-valuation of ideas. Principles from spatial language (Levinson) and cognitive blending illustrate how emotionally-charged mental representations are positioned in a hierarchy of ancestral value. Recurrent forms of grandiose ideation in psychopathology (schizophrenia, mania, narcissism) may evidence the effect of culture-gene coevolution.

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Attractiveness, Chair: R. Elisabeth Cornwell
Lecture Hall A, Saturday afternoon

4.35 PM

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SHIFTING MALE PREFERENCES FOR FEMALE BODY TYPE: AN ADAPTIVE RESPONSE TO A CHANGING WESTERN SOCIOECONOMIC ENVIRONMENT?

The debate over changing ideals of beauty in Western society remains unresolved more than 10 years after Singh's first publication of a universal male preference for female fecundity (waist-to-hip ratio of 0.7). In a re-analysis of Playboy centrefolds from 1956-2004 (n=525), height is shown to increase significantly over time (beyond a level that could be attributed to a positive secular trend). Alongside the previously documented increase in WHR ratio (more tubular) and decrease in Body Mass Index: BMI (to below a fecund range), these results represent a shift in male preferences away from signals of maximum fecundity, and towards a more androgynous female body. Experimental results from young females (aged 20-30, n=440) collected via online questionnaires show increasing height and decreasing BMI relate to decreasing reproductive ambition (ideal number of children, ideal age of first child, importance of having children, and self-rated maternal/broodiness) and increasing measures of resource accumulation (job importance, competitiveness in workplace). Results from post-reproductive females (age >45, n=370) confirm reports of decreased reproductive events in taller females (fewer children, older at time of first child). Both results suggest that the change in male preferences may reflect favour for females who desire later reproduction. These female behaviours may be biologically driven by increased androgen levels and psychologically manifested via increased competitiveness and career drive. This change in

Western male preferences can be interpreted as an adaptive response to ecological conditions where a smaller family size and dual-parent income are advantageous.

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PREGNANCY AND MENSTRUAL CYCLE ALTER ATTRACTION TO APPARENT HEALTH IN FACES

Women's preferences for putative cues to the strength of men's immune systems (e.g. facial masculinity) increase during the late follicular, fertile phase of the menstrual cycle. During pregnancy, aversion to foods likely to be contaminated with infectious bacteria increases. Increased progesterone levels that also characterise the luteal menstrual cycle phase are thought to trigger these aversions. As apparent facial health may signal a strong immune system and/or absence of acute illness, different predictions about hormone-mediated variation in preferences for men's facial health are suggested by findings for food and face preferences. Previous findings of cyclic shifts in attraction to men's faces with masculine shapes suggest attraction to apparent health in male faces may be strongest during the late follicular phase of the menstrual cycle and in non-pregnant women due to possible indirect benefits (e.g. healthy offspring). By contrast, previous findings of changes in food preferences during pregnancy suggest attraction to apparent health in male faces may be strongest during the luteal phase of the menstrual cycle and in pregnant women due to possible direct benefits (e.g. contagion avoidance). Tests of these predictions using prototype-based transformation techniques to manipulate apparent health of face images indicated health preferences were 1) stronger during the luteal than late follicular phase of the cycle and 2) stronger in pregnant women than in non-pregnant women. These findings suggest adaptations that reduce the risk of infection during pregnancy influence women's face preferences.

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5.15 PM

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THE ROLE OF SIMILARITY AT DIFFERENT STAGES OF DEVELOPING FRIENDSHIPS

In this study the role of similarity as a criterion for the choice of friends was investigated. The impact of the proposed reasons why similarity should play a role – genetic similarity theory and predictability – were analysed. 40 female freshmen, who were new to Vienna documented their acquaintances during their first two months in Vienna. The data acquired of each participant and their acquaintances covered personality, special interests, body measurements, special interests, etc. Above that, facial photographs were digitally analysed. The degree of initial attraction at the first interaction and the quality of the relationships after six months were investigated. Similarity in various phenotypic features has an impact on initial attraction. This effect is less prevalent after six months. Similarity plays a more important role in female-female interactions than in female-male interactions. Of the investigated phenotypic features, those which affect day-to-day interactions have a stronger influence on the quality of the relationships than those which are the most reliable predictors of genetic similarity. Female-female relationships are more prevalent than female-male relationships. Above that, females feel more attracted to other females than to men. Same-sex relationships are of higher quality than cross-sex relationships. The present study emphasises the role of similarity as a decision criterion for the initiation of social interactions. The importance of similarity decreases the longer a relationship lasts. Female bonding seems to be present in modern humans, as a result of the patrilocality of human ancestors.

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*EVIDENCE FOR THE EXISTENCE OF TWO ALTERNATIVE PERCEPTIONS
OF MALE FACIAL ATTRACTIVENESS*

The theory of sexual selection predicts that exaggeration of sex-specific traits increases reproductive fitness. Exaggeration of female-specific traits in morphed averaged female faces, indeed, increases attractiveness. On the other hand, whether male-specific traits influence male facial attractiveness is still matter of debate. Some studies reported preference for a masculine face, some preference for a feminine face and some preference for average face. We asked 167 female subjects to select the most attractive face in a continuum of male faces ranging from low masculinity to high masculinity created by a morphing programme. The subject were confronted by two different face stimuli. The first was an averaged face with dark hairs and eyes, the second face had blue eyes and blond hairs. The two stimuli differed in colour map but not geometry. We recorded a bimodal distribution of preferences: one peak of preferences corresponds to a low-masculinity face, the second peak to a high-masculinity face. Moreover, a masculine face is preferred for the dark stimulus, but a feminine face is preferred for the blond stimulus. Preferences for long-term partner, on the other hand, was unimodal and centred on a feminine face for both stimuli. This result, based on a relatively large sample, can explain inconsistencies of previous studies.

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PHYSICAL ATTRACTIVENESS, ATHLETIC ABILITY, AND SEX HORMONES IN MALES

Throughout the longest time of human history, male athletic ability arguably contributed to male mate value. Everything else being equal, athletic males could better protect their mates and children and could better accrue resources for their families. Thus, it would have been adaptive for women to feel attracted by men whose physical properties indicate athletic ability. Male cues to athletic ability that attract women might be testosterone dependent, because testosterone promotes muscle growth and likely induces physical masculinity, which contributes to male attractiveness (Johnston et al., 2001, E&HB). To test these assumptions, we assessed the athletic ability of 102 men in their early twenties by means of the HARO-fitness test. Faces and bodies (front and back) were photographed, and later rated for attractiveness by groups of young women. Facial masculinity was assessed by ratings and measurements. We also sampled blood from our participants to analyze levels of free sex hormones. Women consistently and strongly preferred the bodies (but not the faces) of athletic males. Controlling for potential confounds (like smoking and weekly hours of exercise) did not affect these relationships. Moreover, athletic participants reported higher numbers of sex partners and epc partners. However, the relationship between athletic ability and attractiveness was hardly mediated by sex hormones. In sum, our results strongly support the idea that the ability of women to regard the bodies of (particular) men as either attractive or unattractive is an evolved adaptation that helped to favourably guide female mate choice toward athletically able men.

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6.15 PM

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DEVELOPMENTAL INFLUENCES ON MATE CHOICE IN YOUNG ADULTS

Previous research has indicated the importance of individual differences on mate choice strategies. Here, we investigate the possible influences of developmental hormones and the role of two developmental events, onset of puberty and initial coitus, on mate choice in early adulthood. Composite images of high and low sexually dimorphic faces were used to create interactive face sequencing tasks to assess individual preferences for facial attractiveness. Our results indicate that early pubertal development, and particularly early sexual experience, influence the degree of preference for sexually dimorphic characteristics in opposite sex faces. For males, early puberty and initial coitus predict preferences for more feminised female faces, and in women, early coitus predicts a preference for more masculinised male faces. We discuss the possible effects of developmental hormones and learning, as well as juvenile behaviour on the sexual strategies that emerge in early adulthood; and, how different strategies in men and women may result.

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Depression and Psychopathology, Chair: Rosemary L. Hopcroft Lecture Hall B, Saturday afternoon

4.35 PM

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THE RELATION OF DEPRESSION TO MATING AND SEXUAL BEHAVIORS

A review of current literature indicates that sexual behaviour (as opposed to sexual desire or interest) of depressed individuals is not well understood. The reduced fertility rates found for women with a history of depressive symptoms are assumed to be associated with reduced sexual desire and behaviour. Pharmacological treatment of depression may also be a contributing factor to such reduction. The current study explored the assumption that depressed symptoms would be associated with less mating and sexual behaviours. After controlling for age and romantic relationship status in a sample of undergraduate women (N = 180), depressive symptomatology was not significantly related to frequency and variety of sexual behaviour; however, depressive symptoms were significantly associated with relatively less conservative sociosexual orientation and greater participation in some mating behaviours that promote romantic and sexual relationships. These findings are discussed in the context of attachment theory as extended to adult relationships. The literature is consistent with the proposition that less secure attachment will be characteristic of the adult relationships of depressed individuals. The current findings are consistent with depressive symptomatology at mild to moderate levels being associated with utilizing more proximity seeking behaviours to facilitate and maintain adult relationships.

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DO THE SEXUAL SIDE-EFFECTS OF ANTIDEPRESSANTS JEOPARDIZE ROMANTIC LOVE AND MARRIAGE?

Since the release of Prozac in 1989, many similar serotonin-enhancing antidepressants have emerged and use of these antidepressants has increased dramatically. In the United States alone, 213 million prescriptions for these drugs were filled in 2003. Studies report that as many as 75% of individuals on these medications experience sexual side-effects, including diminished desire, delayed arousal, erectile dysfunction and delayed, muted or absent orgasm. We propose that the sexual side effects of these medications can have more serious consequences than currently appreciated, due to their impact on several related neural mechanisms. Via disruption of dopaminergic brain systems, they can jeopardize feelings of elation and obsessive thinking (central components of romantic love), thereby suppressing the patient's ability to fall in love and /or sustain romantic attraction. Due to their negative effects on sexual desire, arousal and orgasm, they also jeopardize unconscious evolutionary mechanisms designed to enable men and women to assess and pursue appropriate mating partners, make appropriate mate choices, feel attachment to appropriate mates and initiate and /or sustain secure pair bonds--behaviors that can have significant social and genetic consequences. We review the theoretical basis for our hypotheses, discuss the empirical evidence, present psychiatric case illustrations and propose needed research. We conclude that the functional and biological interrelationships between several adaptive neural systems that evolved to direct courtship, mating and reproduction should be considered when prescribing serotonin-enhancing antidepressants for long-term use among sexually healthy, sexual active men and women.

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DEPRESSION, INVESTMENT AND BREASTFEEDING: AN EVOLUTIONARY ANALYSIS OF MOTHERHOOD

Post-natal depression (PND) is of interest to many different research fields due to its wide-ranging implications. However, it is felt that a large part of the illness is under investigated due to a lack of analysis of behavioural data, which, in turn, may be because of the large number of covariates that the researcher has to contend with.

Analysis of a small pilot behavioural data set (N = 110) in relation to scores on the Edinburgh Post-natal Depression Scale (EPDS) has shown that there are several behavioural variables that can be used to predict EPDS score, either by themselves or in conjunction with other variables. These include, in the mother, a previous history of depression, an intention to have more children, educational level, and whether any illnesses were encountered during the pregnancy. Habitation status of the baby's father was also an important factor. However, by far the most influential variable was whether or not the mother was currently breastfeeding. Those women who were not currently breastfeeding were shown to have higher scores on the EPDS than those who were breastfeeding or who had previously breastfed ($p = 0.001$, $f = 12.205$, $df = 1$), a result, which implies that the breastfeeding state is the evolutionarily stable state for the new mother, and may be the best way to ensure the health of both mother and infant in the post-partum period.

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BETWEEN NATURE AND CULTURE: WOMEN AND DEPRESSION ACROSS 26 COUNTRIES

The sex difference in depression is well documented in westernized, developed societies, although there has been little quantitative cross-cultural research on the topic. Sociologists have argued that the sex difference in depression is primarily a result of unequal social and economic roles in westernized, developed societies. Conversely, evolutionary psychologists have argued that the greater tendency of women towards depression is an evolved predisposition. In this study, we examine gender differences in depression across 26 westernized and non-westernized countries using data from the U.S. General Social Survey and the World Values Survey. Consistent with evolutionary arguments, young women across all types of countries are more likely to report depressive symptoms than young men. Consistent with sociological arguments, the gender difference in depression among those over 50 is only found in westernized, developed countries.

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*ADAPTATION AND DYSFUNCTION: A DARWINIAN PSYCHODYNAMICS
OF PARANOID SCHIZOPHRENIA*

Paranoia used to be a prominent mental disorder, especially in nineteenth-century psychiatry. Nowadays, the central taxon is schizophrenia, paranoid symptoms being classified under either schizophrenia or paranoid personality disorder (PPD). So if at all, most psychiatric theories only discuss paranoid symptoms from the perspective of the covering pathology. They may be justified in doing so, but the fact is that the essential feature of paranoia, i.e. (unwarranted) suspiciousness, has its own evolutionary history, which is different from the evolution of schizophrenia.

Both in paranoid schizophrenia and in PPD suspicion goes off the rails. However, although PPD often fades into paranoid schizophrenia, in both disorders, we argue, suspicion goes mad for different reasons. As with anxiety and depression, we all share, in some degree, the paranoid disposition. Being a blow-up of this disposition, paranoid suspiciousness in PPD lies on a continuum with normal behaviour and experience.

In the case of paranoid schizophrenia, another explanatory model must be invoked, which can be dubbed a 'Darwinian psychodynamics'. It bears on all illnesses involving the strongly fixated use of defence mechanisms in non-appropriate contexts. The 'harmful dysfunctions' (Wakefield 1992) involved in schizophrenia (e.g. temporal lobe volume differences) trigger certain adaptive defences, like for example suspicion. Since these defences are not appropriate in the circumstances, they do not eliminate the threat. Hence suspicion spreads further and further until, finally, other adaptive strategies are deployed, thus eliciting two other schizophrenic subtypes: megalomania (fight) and catatonia (freeze).

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THE RISE OF PSYCHOSOCIAL PROBLEMS, ATTACHMENT AND MISMATCH

Psychosocial problems in children and young people have increased in the last 50 years in the developed world despite reduction in the poverty with which these problems are often associated. At the same time the environment in which parents rear children has changed greatly from that of 50 years ago and from that of our Hunter Gatherer ancestors. One mechanism by which these changes could contribute to the rise in psychosocial problems is via attachment relationships, and at worst by promoting profoundly alienated young people. Social/therapeutic programmes which have improved parents' environment for parenting, and their children's outcome, have, without aiming to do that, usually moved that environment nearer in important aspects to that of Hunter Gatherers'.

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Language Acquisition and Evolution (Symposium), Chair: Paul Vogt
Lecture Hall C, Saturday afternoon

LANGUAGE ACQUISITION AND EVOLUTION

It is widely believed that language has evolved through mutual interactive behaviour of individuals within an ecological niche, through individual adaptations and self-organisation. Humans communicate with each other about events that happen in their environment. When novel events occur, they might construct new internal representations of these events - either by learning from other behaviour or inventing new behaviour. They can then transmit this newly constructed knowledge to other humans. By subsequent local interactions between individuals, self-organisation can guide the emergence of a global structure called language as has repeatedly been shown by several computer models.

Many computational studies on the evolution of language have primarily focused on the idea that language is a complex dynamical adaptive system, as outlined above. Central to these studies is the cultural evolution of language, i.e. language is thought to evolve based on cultural transmissions rather than on biological adaptations. Cultural transmission of language is impossible without the ability to learn language. This symposium focuses on the effect of different approaches towards language acquisition on the evolution of language. For instance, one might ask if language is formed such that it is learnable, if our acquisition skills are adapted to learn language, or if the two co-evolved.

The proposed symposium looks at this issue from different angles, though with a common methodology and viewpoint. The different angles relate to the specific aspects of languages that the participants study. These aspects include the evolution of sound systems, colour categories, grounded word-meanings, linguistic diversity and the emergence of compositional structures in language. The participants have all researched one these aspects using computer models and all share the view that language is a complex dynamical adaptive system. Moreover, they strongly believe that the way human beings behave and interact with the world around us shapes the way we acquire language and this, in turn, reflects the way human language evolves.

List of participants:

Tony Belpaeme (Vrije Universiteit Brussel, Belgium) "Innateness of colour categories is a red herring: insights from computational modelling" Tony will speak about how colour categories can be acquired and compares models of cultural evolution of colour categories with models of genetic evolution. The results appear to favour cultural evolution based on language acquisition.

Bart de Boer (Rijksuniversiteit Groningen, the Netherlands) "Acquisition and the evolution of speech". Bart will talk about the effect of child directed speech on the ability to learn sound systems. Parents typically use more articulated and simpler speech directed towards children. It has been shown that this improves language acquisition, but what does it mean for language evolution?

Daniel J. Livingstone (University of Paisley, United Kingdom) "Language acquisition and diversity: The evolution of dialects" Daniel will talk about the effect language acquisition and diversity have on the evolution of dialects.

Andrew D.M. Smith (University of Edinburgh, United Kingdom) "Inferential communication as a driving force in the acquisition and evolution of language" Andrew will talk about the importance of the word-learning process in language acquisition, and how this can help us understand processes of linguistic evolution.

Paul Vogt (University of Edinburgh, United Kingdom and Tilburg University, the Netherlands) "Acquisition mechanisms to discover linguistic structures" Paul will talk on how compositional structures can be acquired by discovering regularities in the sensorimotor space of behaviour, and he will discuss what this could mean for the evolution of language acquisition mechanisms.

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4.35 PM

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*INNATENESS OF COLOUR CATEGORIES IS A RED HERRING: INSIGHTS
FROM COMPUTATIONAL MODELLING*

Recent evidence (Kay & Regier, 2003) has demonstrated, again, the striking fact that colour categories show an extraordinary similarity across well-separated cultures. From Papua New Guinea to Patagonia, all cultures seem to have categories which correspond to some extent to what in English would be named white, black, red, green, yellow, and so on. Typically, innate constraints on chromatic perception have been used to explain the universality of colour categories. However, alternative positions exist. We critically assess three hypotheses: (1) genetic determinism, claiming that colour categories are subject to innate biases, (2) empiricism, claiming that individual learning in a structured ecology shapes colour categories and (3) culturalism, claiming that cultural interactions determine the nature of colour categories. Using computer modelling, we pinpoint the vulnerabilities in each hypothesis. Genetic constraints seem to fall short in explaining the seemingly random, although low, variability across cultures. The empiricist position on the other hand, relying on the constraints posed by the learning mechanism, the psychophysical properties of chromatic perception and the structure of the chromatic environment, seems not to contain enough bias to explain human colour categories. While culturalism, hinging on the fact that colour categories are used in cultural and communicative interactions, does seem to be a valid candidate to explain how colour categories become shared in a culture, but fails to explain the sharing *between* cultures. We conclude that linguistic relativism, on top of innate and ecological biases, is crucial in explaining the nature of human colour categories.

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4.55 PM

Bart de Boer
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ACQUISITION AND THE EVOLUTION OF SPEECH

Acquisition is clearly important for understanding the evolution of human language. Acquisition determines what is easy and what is hard to learn and therefore, through iterated learning, what languages will tend to look like. This happens relatively fast and is therefore an example of cultural learning. However, languages that are used in a population of speakers will eventually influence the biological evolution of the language users and biological, genetically determined adaptations will evolve. This talk will focus on these mechanisms in the case of speech. A short overview of how children acquire speech will be presented, as well as a short overview of the paleontological evidence of the evolution of speech. Also, the possible interaction between parental speech behavior and the acquisition of speech is discussed. Through a comparison of these data and studies of non-human primates, the probable differences between the human faculty for speech and of that of our evolutionary ancestors are identified.

On the basis of theoretical considerations, a possible path from primate-like speech systems to human-like speech systems is proposed. The aim of the presentation is to present the issues that surround the evolution of speech and to reconstruct a possible way in which speech could have evolved.

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LANGUAGE ACQUISITION AND DIVERSITY: THE EVOLUTION OF DIALECTS

The utility of dialect differences for social marking is well known, and has given rise to arguments that the observed patterns of linguistic diversity and the evolution of dialects is the result of the adaptation of language to serve as a social marker.

For example, one recent account argues that a language ability which had evolved to facilitate communication should favour stability and suppress variation to maximise communicative success [1]. As random drift could not possibly account for the amount of variation and diversity found in human languages and dialects, a language ability which promotes change and variation must have been deliberately selected.

Expanding our previous arguments [2], we counter that it is not necessary to invoke the utility of language for social marking to explain the emergence of dialects. The nature of the cultural processes involved in language acquisition, combined with key features of language that serve to maximise communicative success, give rise to the frequently observed rapid evolution of dialects and languages. Finally, we conclude by considering how we should then account for the use of dialect as a social marker, and what effect this might have on the cultural evolution of dialects.

[1] Dunbar, R.I.M., 2003, The Origin and Subsequent Evolution of Language, in Language Evolution, M.H. Christiansen and S. Kirby, Editors. Oxford University Press.

[2] Livingstone, D., 2002, The Evolution of Dialect Diversity, in Simulating the evolution of language, A. Cangelosi and D. Parisi, Editors. Springer-Verlag: London.

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INFERENCE COMMUNICATION AS A DRIVING FORCE IN THE ACQUISITION AND EVOLUTION OF LANGUAGE

In this paper, I will describe the crucial importance of the inference of meaning as a major driving force behind not only the acquisition of language by children, but also the historical bootstrapping of communication, and its progressive complication towards more language-like systems.

Much recent work in evolutionary linguistics which purports to demonstrate the emergence of syntax relies on models of communication in which the signals are redundant and which contain an explicit semantic blueprint against which the syntactic structure is built, leading to doubts about the nature of the emergence which is taking place. A plausible scenario for the evolution of such a system, moreover, is extremely problematic, both because there is no advantage in a single individual being able to map signals to meanings without anyone else to communicate with, and because the cultural nature of language acquisition means that even a group of similar mutants have no advantage without a pre-existing language for them to learn.

In contrast, I will show how considering mutations which allow individuals to *infer* the meanings of signals provides a potential explanatory paradigm for how communication is initially started, and then becomes progressively more complicated over time, without any catastrophic effects. Because communication is based on reference, individuals can have different internal representations of meaning and yet still communicate successfully. Furthermore, I will show how the repeated re-inference of meaning from

context over generations of language users provides the necessary variation in language which drives historical linguistic change.

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5.55 PM

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ACQUISITION MECHANISMS TO DISCOVER LINGUISTIC STRUCTURES

One of the most prominent aspects of human language is the ability to form - in principle - an infinite number of sentences by using a finite number of means. The principle reason why this is the case is that humans have grammar. In this paper I will look at the evolution of one important aspect of grammar, namely compositionality. The meanings of a compositional utterance can be decomposed into the meanings of the utterance's parts, and the way in which the parts are put together, whereas there is no such relationship for holistic utterances.

Computational studies have recently shown that compositional languages can emerge in a population of communicating individuals by exploiting structures the agents can discover in their interaction with the world and in their linguistic utterances. Basically, the computational studies model individuals who try to discover regularities in their sensorimotor patterns in order to acquire compositional semantic and linguistic structures in language. Given this acquisition mechanism, compositional structures tend to emerge rather easily. This finding poses an interesting question: If compositional structures seem to evolve rather easily, then why do other species not reveal to have such a rich use of compositional structures as humans do? Is this because humans have evolved an acquisition mechanism specialised in acquiring compositional structures? Or is this because we fail to discover compositional behaviour in other species?

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Competition and Aggression, Chair: Detlef Fetchenhauer Lecture Hall D, Saturday afternoon

4.35 PM

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A QUALITATIVE EXPLORATION OF STRATEGIES FOR INTRASEXUAL COMPETITION

Intrasexual competition is the term used to describe the idea that males and females compete with others of their own sex for access to potential mates. Self promotion and competitor derogation are the two most commonly investigated strategies for intrasexual competition. Self promotion is the enhancement of one's positive qualities, relative to those possessed by members of the same sex, while competitor derogation is any act used to decrease a rivals' mate value, relative to oneself. In the current study, participants listed the ways that they compete with same-sex others for dating partners or attention from the opposite sex. We used an open-ended format and qualitative analyses based on grounded theory. The results revealed two additional strategies: attention manipulation and manipulating mate value. By using the strategy of attention manipulation, individuals attempt to sequester mates from rivals and reduce the need for competition. For example, women may invite the mate to an event and purposely exclude their rivals. Similarly, the strategy of manipulating mate value reduces the necessity of competition, as individuals attempt to decrease the value of the target mate to rivals. For example, women may tell their rivals that

the mate is unfaithful or homosexual. We also investigated the relative use of these four strategies which revealed that participants tended to use the strategy of self promotion the most frequently, followed by competitor derogation, attention manipulation and manipulating mate value. Our discussion focusses on explanations for this variance in strategy usage, and will also describe sex-specific tactics.

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4.55 PM

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WHY IT'S BAD TO BE DEAD: THE EVOLUTION OF ADAPTATIONS TO PREVENT BEING MURDERED

Conspecific killing has been a recurrent "hostile force of nature" for humans. The fitness costs incurred by sudden and premature death have been large in magnitude and numerous in nature. These costs include: (1) a total loss of access to current mates; (2) the elimination of all future reproductive opportunities; (3) a termination of the ability to invest in offspring; (4) the increased vulnerability and exploitability of one's children; (5) the weakening of one's entire kin coalition; and (6) the redirection of reproductively-relevant resources to rivals. Getting killed, in short, is extremely costly. These costs would have created intense selection for adaptations to circumvent being killed. We present a theory of homicide-avoidance adaptations founded on the premise that humans have confronted a large number of distinct and recurrent contexts of an elevated risk of being murdered. These conditions, with a selectively significant degree of probability, resulted in the danger of being killed as a child by a strange male, being murdered by an intrasexual rival, being killed when discovered in flagrante delicto with another's mate, experiencing death at the hands of a mate one has deserted, succumbing to an invading rival coalition, and many more. We present empirical evidence from three studies for psychological adaptations designed to defend against the killers among us. We conclude by proposing that the evidence reciprocally supports the theory that specific defenses could not have evolved without correspondingly numerous and specific adaptations designed to kill other humans.

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5.15 PM

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MATING STRATEGIES AND PREFERENCE FOR DOMINANT MEN AS DETERMINANTS OF FEMALES' SEXUAL VICTIMIZATIONS

Previous studies have shown that a female's chance to become sexually aggressed by men is positively related to her reproductive strategy – the higher a female's sociosexuality and the more positive her attitudes towards risk taking, the more often she is victimized through male sexual violence. A study with N=398 Dutch women revealed that this relationship is mediated by females' mating strategies. The more often women go out on their own, try to attract the attention of unknown men (e.g., by wearing short skirts or using extensive make up), try to get into contact with them and the more often they are together with male strangers at private places, the more often they are sexually victimized. Another mediator between female reproductive strategies and their chance of being sexually aggressed was females' preference for dominant and risk taking men. This mediation effect was demonstrated by measuring females' preferences for being dominated by one's sexual partner (e.g., "I like my partner to be a little bit rough to me while we have sex with each other"). Furthermore, a second study (N=98) showed that females' own level of risk attitudes was positively related to their preferences for risk-taking as opposed to risk-avoiding men. Yet, a third and fourth study with a total of N=240 Dutch men revealed that males' risk attitudes are

positively related to their willingness to use sexual violence. It will be discussed how these findings can be integrated into an evolutionary perspective on female mating strategies and male sexual violence.

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5.35 PM

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DEFAMATORY TECHNIQUES IN INTERPERSONAL ACCOUNTS

Gossip, the recounting of the doings of other members of one's social group, has been receiving increasing attention from evolutionary psychologists. The present study is based on the assumption that gossip can be used as a vehicle of moralistic aggression. In other words, describing the actions of a group member with whom one is angry in a negative or derogatory way can be a way of harming that person by harming his or her reputation. In this study, participants were asked to recount a negative interpersonal incident (supplied by the experimenter in skeleton form) to one of three different imagined audiences: a friend to whom one wants to convey one's anger, a friend to whom one wants to give a fair and unbiased account, or a diary. As predicted, participants in the condition where they were willing and able to convey anger were more likely to use narrative devices such as describing the negative consequences of the other person's action, emphasizing their own continuing anger, justifying that anger, and stating that they sought restitution. Participants striving to be fair and unbiased or those imagining writing in diaries were much less likely to use such devices.

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5.55 PM

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WHAT CREDIT DO WE GIVE TO INFORMATION COMING FROM OTHERS?

Clearly, a great deal of our knowledge comes from communication and this would not be possible without a certain amount of trust. However, evolutionary arguments such as Machiavellian intelligence put forward the possibility of manipulation. So we should be careful about potentially transmitted false beliefs. Hence we hypothesized that information acquired via communication is processed differently from information we acquired ourselves. Using a belief revision framework, we designed two experiments to test this hypothesis. Both experiments were framed in a naturalist context, but their logical content boils down to that: subjects were told that they witnessed a certain event X times, and that somebody else witnessed an incompatible event Y times, with $X < Y$. Trust predicts that we believe Y, but most people prefer to believe X. We take those results to show that people have a different appreciation of information they acquire by themselves from information transmitted by others. More experiments are under way to get a clearer picture of the way those two kinds of information come to be differentially processed.

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6.15 PM

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*LETHAL COALITIONAL AGGRESSION IN WILD CAPUCHIN MONKEYS: IMPLICATIONS
FOR THE EVOLUTION OF WARFARE*

The imbalance-of-power hypothesis (Manson & Wrangham 1991) states that high rates of lethal aggression in humans and chimpanzees, compared to other primates, are explicable as a result of fission-fusion social organization, which permits large traveling parties to launch low-cost lethal attacks on lone individuals from neighboring social groups. Data from a 14-year study of white-faced capuchins (*Cebus capucinus*), which do not live in fission-fusion societies, pose a challenge to this hypothesis. We have observed three confirmed and two inferred lethal coalitionary attacks on adult males. In one case, an alpha male was badly wounded and evicted from his group, and when later found by his former groupmates he was attacked by several of them and died <24 h later. In two other cases, lone extra-group males were mobbed by males of a bisexual group. One victim died of his wounds; a second was quite badly bitten but may have escaped. The last two cases resulted from intergroup encounters. One victim lost the use of both arms but may have survived, whereas the other died of unknown causes within an hour of the attack. The observed death rate from coalitionary aggression at our site is approximately the same as that reported for eastern chimpanzees. Because capuchins are the most highly encephalized nonhuman primate, these data suggest reconsideration of the hypothesis that sophisticated cognitive abilities underpin the conduct of lethal coalitionary aggression. Another hypothesis is that variation in species-typical temperaments (behavioral syndromes) partially explains variation in intensity of aggression.

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Costly Signaling and Cooperation, Chair: Elizabeth Cashdan
Audimax, Sunday morning

10.20 AM

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*GIVE AND YOU SHALL RECEIVE. GIVE MORE AND YOU SHALL BE HONORED. EXPERIMENTAL
EVIDENCE FOR ALTRUISM AS COSTLY SIGNALING*

In two studies, we measured the degree and manner of reciprocation of a public good in subsequent two-by-two interactions. Both studies consisted of two phases: a public good phase and a subsequent give some game (i.e. a gradual Prisoner's dilemma game). In the first study, the public good was a financial game in the lab. In the second study, the public good games were real life student projects. The observed behavior in the subsequent interactions was consistent with the reciprocity rule, but only up to the fairness norm of equality. Students who had invested more than their fair share, did not receive more financial returns than those who had invested a fair share. However, despite the lack of financial benefits, these high investors were preferred more as future team mates (Study 1), or received more social rewards (Study 2). We interpret these findings in terms of altruism as costly signaling.

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10.40 AM

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THE ALTRUIST IN A PUBLIC GOOD GAME: HERO OR ZERO?

The major aim of this study is to show that altruism as costly signaling exists in humans. In two studies participants played public good games with a fixed provision point. Before entering the game, they had observed two unsuccessful rounds. We measured whether people gave more than their fair share (=norm). In study 1, in one condition, participants received an (uninformative) 'mere' instruction to do the fair share. In the other condition no instructions were given. If surpassing the norm reflects costly signaling, it should be suppressed by the instructions because participants are not longer able to honestly signal quality.

In study 1 (N = 111), fewer people did more than the norm in the instruction-condition than in the conditions without instructions, irrespective of the origin of the instruction (inside or outside the group). In study 2 (N = 71), men were more likely to surpass the norm when the instructor warded off responsibility for the collective fate than when the instructor took full responsibility. Women were more likely to surpass the norm when the instructor took full responsibility. Without a leader, men claim status and women wait. With a leader, men cannot claim status, but women can signal their mate value to the leader.

With respect to the underlying quality we found that people who don't follow the norm (surpassing or rebelling against it) obtain higher Raven-matrix IQ-scores than those following the norm. Consequentially, people may signal intelligence by means of altruistic behavior.

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11.00 AM

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THE NATURE OF VIRTUE IN SOCIAL INTERACTIONS: COSTLY SIGNALING OR RECIPROCITY AND SYMPATHY?

The One World Café is a unique Salt Lake City restaurant where there are no prices and no obligation to pay. Patrons simply pay what they deem to be fair, yet the restaurant is economically successful. Because most rational choice models assume that individual goals are selfish, the question we asked was: why would anyone pay anything at all? This study tests two competing hypotheses: (a) that generosity reflects reciprocal altruism motivated by feelings of sympathy with the proprietor, and (b) that generosity reflects costly signaling and showing off, and is sensitive to the size and composition of the audience. Some economists have suggested that feelings of sympathy (concern for the other) are responsible for moral attitudes, which in turn encourage cooperation and acts of virtue. Robert Frank, among others, argues that a sympathetic bond will increase cooperation and acts of virtue because individuals want trustworthy trading partners who will weigh their own interests. In other words, sympathy can be a proxy for how much you think a person will reciprocate. Preliminary evidence suggests that the One World Cafe is structured in ways that enhance feelings of sympathy, and that this structure may be responsible for the Cafe's economic success. Further data, which we are currently collecting, will allow us to evaluate this argument and test it against the alternative hypothesis that costly signaling determines the amount patrons are willing to pay.

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11.20 AM

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HUNTER STATUS AND REPRODUCTIVE SUCCESS IN NORTHERN SIBERIA

This research is an extension of work conducted since 2001 on the behavioral ecology of food sharing among indigenous North Siberian hunters and gatherers. In order to test ideas about the importance of food sharing in social organization, a series of cost-benefit models have been proposed to explain the variation in food sharing in contemporary hunter-gatherer societies. One of these hypotheses, referred to as the costly-signaling hypothesis, focuses on the probable social and reproductive benefits to hunters, who non-contingently give meat from big-game kills to community members. This paper will utilize rank-order interviews conducted in 2003 among residents of the Dolgan and Nganasan study community in Northern Siberia on the relative respectability (status) of over 150 male hunters. A composite status score generated from these rank order interviews, as well as component scores, will be analyzed in light of known food sharing patterns, family size, spouse and daughter fertility rates, and mortality rates of offspring of all hunters in the community. The information on reproductive success will be generated from census data (also collected in 2003 for the community), as well as genealogical interviews conducted in the community during every research trip since 1994. The socio-demographic, genealogical data, and food sharing will be used to check for variable relationships predicted for the show-off hypothesis.

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11.40 AM

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ALL MUST HAVE PRIZES? TOURNAMENTS, MATCHING AND INEQUALITY

We consider matching tournaments, suitable for the analysis of, at two extremes, labour markets and sexual selection. On one side, applicants signal their unobservable ability by costly displays of effort. Under assortative matching, higher effort leads to a better match. Thus, rather than a "winner-take-all" tournament, there are multiple ranked prizes. That is, the participant with the highest output gets first prize (the best match), the second placed competitor gets second prize and so on. We contrast this model of signalling relative position with standard signalling models which communicate the signaller's absolute type and find that the standard model is a special case of the relative model. Second, in the relative model, equilibrium strategies and payoffs depend on the distributions of types of the competitors and the distribution of prizes. An increase in the inequality of competitors tends to reduce effort and can make all competitors better off. However, an increase in the dispersion of the rewards increases effort and can make all worse off. We use these results to investigate the effects of inequality. For example, increases in which forms of social inequality might be associated with a decrease in happiness. Second, in the context of sexual selection, where the resources diverted into a male's handicap is signal of underlying fitness, we show that such a signalling equilibrium is likely to only be possible under polygyny and that the degree of handicap supported in equilibrium is positively related to the degree of polygyny.

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12.00 PM

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EXPLAINING ALTRUISM: WHY WE GIVE TIME AND MONEY TO STRANGERS

When an individual acts out of personal interest we can easily understand the motivations. The paradox is why individuals should help others at a cost to themselves. Evolutionary theory can explain self-sacrifice

for relatives as a strategy to propagate genes shared in common to the next generation and because fitness benefits are obtained, such help is not in biological terms altruistic. But the answer to why individuals should help non-relatives or even contribute to the well-being of the wider group is more complex. The study in question focuses on economic and time help given to unrelated persons and towards a group. Individuals often do favours for friends or neighbours providing money, running errands, or babysitting. Also, in industrial societies there is strong cultural emphasis on giving support to the wider group and much of the energy and wealth flows occur through charitable organisations. A comparative analysis of different kinds of “altruism” (towards relatives, unrelated persons, and charities) shows that there are distinct variables associated with each: that is, economic and social factors can tell us something about how likely one is to give and to whom. More interestingly though, logistic regression analyses show a positive relationship between mating success and giving to charitable causes. Together with the results from the comparative analysis this study suggests that while giving to unrelated persons may be a form of reciprocal altruism, giving to charitable causes is costly signalling of high quality, while not discarding other simultaneous processes operating such as multi-level selection.

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Religion, Morality, and Ethnicity, Chair: Mark C. Mescher
Lecture Hall A, Sunday morning

10.20 AM

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THE CONSILIENCE OF RELIGION AND SCIENCE: AN EVOLUTIONARY PERSPECTIVE, PART 1

The apparent conflict between science and religion is long standing; however, recent progress in the study of religion as a product of biological and cultural evolution offers a new perspective on this issue. Religious institutions are increasingly seen as products of cultural evolution, shaped by universal human cognitive predispositions and by local socio-cultural factors. From this vantage point, the relatively recent emergence of science represents a major environmental challenge to religious institutions, which have not previously had to reconcile their beliefs with an externally validated set of facts. This perspective shifts focus from asking whether religion, conceived as a static entity, is currently compatible with science to the more important question of whether—and how—religion, conceived as a dynamic institution capable of adaptive change, can be made compatible with science while still fulfilling its positive roles in human societies and in the lives of individual practitioners—for example, as a storehouse of practical knowledge, an arena for cooperative social interaction, and an avenue for exploring the genuine human capacity for spiritual experience. Bridging the gap between science and religion is an important science education issue because theologically liberal religious institutions often fair poorly in competition with more fundamentalist institutions that explicitly reject science, especially in populations with low levels of scientific literacy; meanwhile, the findings of modern science will inevitably remain unpalatable to large segments of the human population so long as they are viewed as irreconcilable with a spiritually fulfilling worldview.

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10.40 AM

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MAKING BIOLOGICAL SENSE OF RELIGIOUS SACRIFICE

Explaining non-reciprocal altruism to non-kin remains a conundrum for evolutionary psychologists. Religious sacrificing, an ubiquitous phenomenon in human civilizations, is perceived as forfeiting a valued

possession without gain. Specifically, sacrifice is commonly considered a zero sum behavior in which something valuable is surrendered or destroyed and nothing received in return. Analyses of religious sacrifice typically focus on the theological and folkloric, characterizing this sacred activity as a gift of appeasement to locally-operating supernatural agents. Since supernatural agency is scientifically unverifiable and unfalsifiable, those who "explain" religious sacrifice by supernatural referencing cannot be using the methodology of natural science. While exotic, colorful descriptions may be useful to cultural anthropology and comparative religion, they are useless to those seeking explanations resonant with biological theory.

This paper will utilize costly signaling theory to reveal the biological basis of religious sacrifice to be, on average, a net gain in prestige (hence, descendent-leaving) for those who willingly sacrifice. The case study explored will be the Biblical concept of "cherem", a religiously-sanctioned, sacrificial handicap imposed on the Israelite army during the time of Biblical conquest. From battle to battle, the Israelite warriors were continuously forbidden to appropriate various spoils of war for their own use. "Laying waste to the land" (destroying valuable resources such as people, livestock, grain, etc.) can function as a tribally-imposed sacrifice. As such, the conquering co-religionists signal to each other a willingness to continue cooperating by accepting the mutually-shared forfeiture of war spoils.

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11.00 AM

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*HUMEAN, ALL TOO HUMEAN:
FREE WILL, FOLK MORALITY, AND THE DETERRENCE PARADOX*

Much philosophical energy has been vested in trying to determine what significance, if any, scientific discoveries about the human mind will have in terms of moral and legal structure. Especial attention has been lavished on free will, as self-control and intentionality play a significant role in the assessment of culpability. The theorists generally fall in to two camps: science will change nothing about the way we live our lives, or science radically changes everything (usually for the worse). Although a few writers have expressed a moderate position, these arguments are weakened by their exclusive reliance on proximate mechanisms to explain psychological phenomena. Up to this point, furthermore, discussion on the implications of cognitive neuroscience has largely been limited to what should be done, with little heed to the human capacity to change. To fill in these gaps I draw on, and weave together, perspectives from the empiricist David Hume and modern evolutionary theory. I conclude that the effect the new sciences of the mind have on our deeper intuitions (and ultimately society) hinges strongly upon how intractable these intuitions turn out to be, a fact which science itself may illuminate.

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11.20 AM

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*RICHARD DAWKINS' MISUNDERSTANDING OF KIN SELECTION AND THE DELAY IN QUANTIFYING
ETHNIC KINSHIP*

Recent sociobiological research has quantified the kinship coefficient between random co-ethnics as three orders of magnitude greater than that computed from inbreeding within genealogies. The kinship (or relatedness) between random co-ethnics might be as high as that between half siblings or between grandparent and grandchild. This is more than enough to engage ethnicity in inclusive fitness processes. The applicability of inclusive fitness theory to ethnicity was asserted by William Hamilton in 1971, when he retracted the 'identical by descent' clause in his original 1964 formulation. He argued that genetic variance between ethnies alone, without knowledge of genealogy within them, can render ethnic altruism adaptive, subject to Hamilton's Rule. Genetic assay data on inter-population genetic variance was

available from the early 1970s. But the critical quantity needed to extend Hamiltonian theory to ethnies, the kinship coefficient between random members of an ethny, was not computed until 2002. Why the delay? A likely contributing factor is that leading interpreters of Hamilton, most noticeably Richard Dawkins, paid little attention to ethnic kinship. Rare treatments were politically charged and desultory. Dawkins continued to insist on the genealogical definition of kinship through to the present, and explicitly rejected the extension of kin selection to ethnies. He did not distinguish group selection from extended kin selection, though clearly implied by Hamilton's extended theory. Neither was the issue treated seriously by leading population geneticists. I conclude that human fallibility, disciplinary boundaries, and political orientation resulted in the quantification of ethnic kinship being delayed for a generation.

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Idiolectical Approach[®], Chair: Horst Poimann
Lecture Hall B, Sunday morning

10.20 AM

Horst Poimann, Peter Winkler
Stuttgart, Germany

*ARCHAIC RELICS AND THE IDIOLECTICAL APPROACH TO PSYCHOTHERAPY –
PRACTICAL IMPLICATIONS OF EVOLUTIONARY CONCEPTS IN PSYCHOSOMATIC
AND PSYCHOTHERAPEUTIC INTERVENTIONS*

As the Pioneers of evolutionary Medicine and Psychology and of Stress-Research, like W.B. Cannon, pointed out there's a direct line between our physical reactions and symptoms and our evolutionary reaction patterns like flight reactions or attack reactions.

A.D. Jonas, Psychiatrist and Psychotherapist from New York, developed (together with D.F. Jonas) in some studies on evolutionary anthropology the concept of "archaic relics". This concept deals with some more specific sets of reactions that are relics either of our anthropological or of our animal phylogenesis. Many of our today's disfunctions as in our muscle and skeletal system, our heart and circulatory system and our digestive system are direct descendents of formerly useful biological reactions. It is very interesting that many of our idioms and sayings give hints on these connections (like 'to carry a heavy load', 'hard to swallow', 'I can't stomach the fellow', 'to work under pressure' etc.)

The presented psychotherapeutic approach, the Idiolectical[®] approach uses these evolutionary concepts and this wisdom hidden in language together with the individual use of the patient's language (his/her idiolect) to form a very natural psychotherapeutic access to psychosomatic symptoms.

This lecture presents the basic elements of this concept, the practical access to the patient as well as the benefits and effects of combining evolutionary and psychotherapeutic findings in a psychotherapeutic approach.

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10.40 AM

Horst Poimann, Peter Winkler
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ARCHAIC RELICTS AND THE IDIOLECTICAL APPROACH TO PSYCHOTHERAPY – LIVE

In this workshop the contents of the lecture are practically demonstrated by means of interviews on 'trivial' symptoms. The combination of using evolutionary knowledge along with the entering into the individual language (idiolect) of the interview partner in this approach will be explained and demonstrated.

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Attractiveness and Quality, Chair: Kathryn L. Smith
Lecture Hall C, Sunday morning

10.20 AM

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*FEMALE FACIAL ATTRACTIVENESS INCREASES DURING THE FERTILE PHASE
OF THE MENSTRUAL CYCLE*

The fertile period of many primates is accompanied by apparent visual changes. Human females lack such signs of fertility and ovulation therefore been described as concealed. However, this assumption has not yet been empirically tested. Here we tested changes in facial attractiveness during the menstrual cycle in two independent samples.

We took two standard facial photographs of 23 women from Newcastle and 25 from Prague, one during the follicular (day 8-14) and one during the luteal phase (day 17-25) of their cycle. Images were presented in randomized order to 63 males and 61 females in Newcastle and 67 males and 70 females in Prague. Raters were asked to choose the more attractive of two images of the same woman. Images were presented twice: once unmasked and once with masked hair and ears. For each rater, the proportion of follicular images chosen as more attractive was computed. These proportions were subsequently tested against random distribution.

In Prague, both men and women preferred the follicular images significantly more often, in either masked or unmasked. In Newcastle, men chose masked and women chose unmasked follicular images significantly more often. Women's preference of unmasked follicular images was stronger in both samples.

Our results suggest that facial changes across the cycle are perceivable and together with other cues could be used as a guideline for monitoring fertility status in current or potential sexual partners by men, or competitors by women. Therefore, the fertile period in humans should be considered unadvertised, rather than concealed.

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10.40 AM

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FACIAL, BODILY AND HORMONAL CORRELATES OF FATHER ABSENCE

Researchers have suggested that absence of the father during early childhood has long reaching effects on reproductive strategy and development. Here I report a series of studies designed to investigate the possible physical and endocrinal correlates of father absence. Study 1 found that father absence or a poor quality relationship between parents is associated with increased facial and bodily masculinity, and decreased apparent health. Study 2 found that poor quality of the parents' relationship was associated with increased androgen levels. These results highlight the possibility of hormonal mediation of the father absence effect.

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11.00 AM

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DO WOMEN'S FACES HONESTLY SIGNAL LONG-TERM MATE QUALITY?

Previous research has found that male facial characteristics (particularly masculinized facial features such as large jaws) honestly advertise genetic quality through the immunocompetence handicap and that women in the follicular phase of their menstrual cycle rate these features as particularly attractive. However, no research to date has investigated whether women's faces are associated with traits that men view as important when choosing long-term mates (i.e., future risk of infidelity and fertility). In the present research, one hundred forty women completed the Sociosexual Orientation Inventory (SOI; Simpson & Gangestad, 1991) and their faces were photographed. Two sets of independent raters then evaluated each face. First, women who had more unrestricted SOI scores (and therefore pose a greater risk for future infidelity) were evaluated by male raters as being less attractive and less desirable long-term mates. Second, a separate group of raters indicated that these women had more masculine facial features. Critically, the facial masculinity ratings mediated the link between women's SOI scores and the male ratings of their attractiveness and desirability as long-term mates. Testosterone, which fosters the development of more masculine facial features, is related to unrestricted sexual attitudes and behaviors in women and it also predicts higher waist-to-hip ratios (WHR), which indicate lower fertility. The possibility that a more masculine facial appearance, shaped via higher levels of testosterone, honestly signals both an increased risk of infidelity and reduced fertility in women is explored.

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IS ATTRACTIVENESS REALLY A MEASURE OF UNDERLYING HEALTH?

Evolutionary psychology theory suggests that female attractiveness should be based upon cues to health and fertility. Using 3D digital images of 40 female bodies and portrait pictures of their faces, we have investigated the relationship between attractiveness ratings, health ratings and a set of health measures taken on the women who posed for the experimental stimuli. 40 observers (20 male; 20 female) rated the target images for their perceived health and attractiveness. Faces and bodies were rated separately. A high correlation between attractiveness ratings and health ratings was found ($r > 0.925$, $p = 0.001$) for both faces and the bodies suggesting that judgements of both are based on the same factors or that they are equivalent. However, there was a non-significant relationship between either of these ratings and most of the actual health measures. The only actual health measure which was a predictor of the attractiveness and perceived health of the body and the face was body fat composition. When viewing bodies in 3D form, it was found that body fat composition, waist-to-chest ratio, the colour of the skin (i.e. the level of sun tan), and torso-leg-ratio were the only significant predictors of both perceived health and attractiveness. The primary predictor of facial attractiveness and perceived health was body fat composition. The implications of these results are discussed in relation to evolutionary theory.

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WAIST TO HIP RATIO AND BREAST SIZE AS THE HONEST SIGNALS OF WOMAN'S REPRODUCTIVE VALUE

Physical features such as waist to hip ratio and breast size are used by men to assess a woman's attractiveness. However, the evidence showing the relationship between attractiveness and the actual biological determinants of fertility is very limited. Our study investigated the relationship between the waist to hip ratio and breast size and levels of reproductive steroid hormones (progesterone and b-estradiol) in 119 Polish women of mid-reproductive age.

Levels of progesterone and b-estradiol were analysed by the radioimmunoassay in the morning saliva samples taken by each subject every day during the period of a single menstrual cycle. Simultaneously, several anthropometric measurements including waist, hips, breast and under breast circumferences were taken.

We found statistically significant negative correlations between waist to hips ratio and progesterone and b-estradiol levels. We also found positive correlation between breast-to-underbreast ratio and b-estradiol level. Furthermore, women with the combination of the low value of waist to hip ratio (below average) and the high value of breast size (above average) had 26% higher mean b-estradiol and 37% higher mean mid-cycle b-estradiol comparing to women from groups with other combinations of body shape.

These results demonstrate that waist to hip ratio and breast size, which are considered the indicators of attractiveness of a woman, can serve as honest signals of her reproductive value.

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FACIAL SYMMETRY AND TESTOSTERONE IN A SAMPLE OF YOUNG MEN AND WOMEN

Previous studies have shown that women's attractiveness ratings of men's faces are correlated with both degree of symmetry and masculinity and that symmetry and facial masculinity are correlated. Since studies have also found a positive relationship between bodily symmetry and ejaculate size and sperm quality, and since the latter and facial masculinity are androgen influenced traits, we hypothesized that facial symmetry in men, but not in women, is positively correlated with basal levels of testosterone. Portrait photographs and salivary testosterone samples were available for 60 male and 63 female undergraduates from a previous study (Dabbs, 1997). Using the standardized methodology of Grammer and Thornhill (1994), we measured the overall facial fluctuating asymmetry (FA) in the photographs of this sample of men and women and examined the relationship between relative FA and testosterone values. While there was no relationship found between testosterone levels and FA among the men, FA and testosterone were negatively correlated among the women. In other words, surprisingly, the degree of facial symmetry in women (but not in men) was positively correlated with testosterone. Further studies are underway to determine the relationship between testosterone, facial FA, and facial masculinity (following the method of Gangestad and Thornhill (2003).

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*CONTENT ANALYSIS, HUMAN NATURE, AND DEVIATION FROM THE NORM
IN VICTORIAN NOVELS*

Coding forms were completed for forty-four canonical novels of the nineteenth and early twentieth centuries (Austen to Forster). Characteristics coded for include sex of author and sex of character, and for characters also: age, socioeconomic status, protagonistic status (protagonist, antagonist, neutral), motives, personality characteristics, marital status, and mate-selection criteria. Significant findings are: (1) that mate selection criteria for the set of "all characters" correspond to expectations from mate selection studies in evolutionary psychology; (2) that protagonistic status is determined by the intersection of standard mate-selection criteria and altruistic social norms; (3) that male and female authors agree very closely about the differences in personality traits of male and female characters; but (4) that male and female authors vary significantly in attributing mate selection criteria to cross-sex characters. On the basis of these findings, we conclude that (a) literary depictions are susceptible to empirical analysis within the terms available to Darwinian social science; but (b) that literary depictions do not simply reflect species-typical behaviors in a direct way. Literary depictions take human nature or species-typical behavior as their frame of reference, but protagonists and antagonists deviate from populational averages in ways that reflect authorial structures of value. Those structures of value are modified both by individual differences in identity and also by ideals specific to particular cultural periods.

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*DADS AND CADS: ALTERNATIVE MALE MATING STRATEGIES AND FEMALE PREFERENCES FOR
LITERARY CHARACTERS*

Introduction: The proper and dark heroes in British Romantic literature respectively represent long-term "dad" and short-term "cad" male mating strategies. We examine women's hypothetical relationship choices with these characters and their correspondence with psychological indicators of the women's life history attributes.

Methods: In two studies, female college students read descriptive passages of proper and dark heroes. In Study 1, participants rated how likely they would be to have long term committed, short-term, and brief sexual relationships with each character. In Study 2, character attributes and behaviors related to mating relationships were omitted from the passages. Participants made inferences about these aspects, responded to the items from study 1 and additional items, and completed inventories of psychological indicators of life history characteristics.

Results: Women generally preferred proper heroes for long-term relationships and dark heroes for brief sexual relationships. Women were able to make accurate inferences about relational attributes and behaviors when this information was omitted. Women's choices corresponded with indicators of life history characteristics such as attachment style, socio-sexuality, and time perspective.

Discussion: Empirical tests supported our hypotheses derived from evolutionary theory. Women's choices reflected the form of paternal investment (genetic vs. parental) valued in a given type of relationship. Women with psychological profiles indicative of relatively short-term life history strategies had greater tendencies to choose relationships with the cad.

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OF WHAT IS ART A COSTLY SIGNAL?

Among the many fruitful uses of handicap and costly signaling theory has been their contribution to Darwinian accounts of human artmaking, whose apparent "uselessness" had earlier seemed to defy functional explanation. The most popular current evolutionary theories of the arts interpret body ornamentation, dancing, singing, literary language, and dramatic performance as providing signals of an individual's fitness and desirability as a mate. They are "honest signals" of physical beauty, intelligence, creativity, grace, stamina, and other characteristics that indicate good genes. A version of the costly signal hypothesis recognizes that the arts have traditionally been associated with religious ceremony, and includes them with other religious practices as "hard-to-fake" signals of commitment. I propose another interpretation of the excess and other indications of "specialness" that characterize traditional arts: in ceremonial contexts, the arts draw attention to the vital importance of a group's messages, especially about how to deal with perceived uncertainty and lack, and are correlative with individual and group concern about subsistence, safety, health, or prosperity--the existential matters that ceremonies address. The excesses of time, effort, and material resources devoted by individuals and social groups to the arts honestly signal--to whatever spirits are attracted by the display as well as to oneself and other individuals--"this is how much I (we) care." Caring about important outcomes, joining with one's fellows to address vital biological needs, and becoming convinced of the efficacy of one's efforts have ultimate as well as proximate fitness benefits.

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MORE THAN THE SUM OF ITS PARTS: ENVIRONMENTAL STIMULI AND HUMAN BEHAVIOUR

The relevance of environmental stimuli as elicitor for social behaviour has recently attracted a great deal of attention in science. Various empirical studies have investigated the influence of discrete environmental stimuli, such as plants, water or prospect refuge qualities, on the individual willingness to engage social contact and cooperation (Kuo, Bacaicoa & Sullivan, 1998, Hagerhall 2000, Ruso & Atzwanger, 2003). The presented study will engage a multifactorial model to explore the complex interaction of environmental stimuli in an experimental setting and strives to gain a holistic view on human biophilia. The presented data will be discussed on the basis of prevalent theories of evolutionary psychology. The initial biological research approach was enriched by selected methods of social science such as open ended interviews and qualitative observation to a mixed method design. The data set was generated from videotapes of 200.000 persons who passed the experimental setting situated in an shopping mall. The behaviour of 4.050 persons was coded, the movement of additional 7.694 persons was recorded and analyzed with a motion sensitive software. Findings of studies like these affirm the capacity of environmental psychology to generate valid knowledge on human perception and space assessment.

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*MALE REPRODUCTIVE STRATEGIES AND PARENTAL INVESTMENT IN SHERWOOD ANDERSON'S
"THE UNTOLD LIE"*

Introduction: Anderson's 1920 short story depicts the male mind deliberating relative advantages of alternative reproductive strategies--specifically, costs and benefits of short-term mating opportunities versus those of long-term investment.

Methods: Theories and methods of the Adaptionist Program are employed as interpretive tools. Literary characters' motives and actions are examined in terms of adaptive value and fitness.

Results: Human males at various stages of life experience internal conflict and intense ambivalence about long term mating and paternal investment. They tend to be drawn toward those reproductive strategies they have not exercised. Thus the womanizer, who has seduced and abandoned a succession of females, is attracted by the opportunity to obtain a wife and invest in children. The committed husband and father yearns, in contrast, for a life of glamorous and carefree wandering. Ambivalence notwithstanding, the males portrayed tend to opt finally for long-term P.I., a decision that appears to be adaptive in the context of the story's environment.

Discussion: Emphasis falls on the decision-making process as much as on the reproductive decisions themselves; thus this story demonstrates with special clarity how literary texts may contribute usefully to the field of evolutionary psychology. Anderson's story offers a glimpse of proximate mechanisms at work, as readers are invited to compare characters' professed motivations with their actual behavior. Highlighting male perspectives on parental investment, the tale also indicates their attitudes on related issues, including mate selection, intersexual competition, and differential male-female reproductive potential.

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EVOLUTION, BRAIN AND ARTS

The function asymmetry between the two brain hemispheres which originated in the evolution development of man plays an important role in the overall behaviour of man. This asymmetry also reflects on the arts uncovers itself in the contradiction between the semantic, the aesthetic, leftright, male-female, ets., which are connected wiyh the left-right brain hemispheres. The semantic, for instance with its symbolic character is explicable logically detetmined, while the aesthetic depends on our inner felings and is therefore inexplicable. This presents us with a basis for comparative analisys between the different drifts. Surrealism for example, emphasizes the semantic, while abstract painting-ih aesthetic. For a number of neuroethologists these preferences are brain determined. The functional asymmetry is even more clearly manifested in the relation left-right in the arts. Investigating 50000 images from ancient times up io present H. Hufschmidt asserts that right-handed people pint the human profil turned tothe left. His neurophysiological arguments for this are based on the role of the right brain hemisphere on the visual image. According to D.Spennemann this left orientation has its roots in the stone age, but it firmly establishes itself at the age of the greek epos. J.Levy, I.Gordon, D.Hewitt and other are of the opinion that the aesthetic preferences of the different people and cultures from different period are to a great extent influencig by mans biological development.

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POSTER ABSTRACTS

Poster 01

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REPRODUCTIVE STRATEGY AND REPRODUCTIVE TACTICS: AN EXPLORATORY FACTOR ANALYSIS IN YOUNG WOMEN

The constructs reproductive strategy and reproductive tactic are hypothesized as separate, but related. A reproductive strategy is an integrated set of adaptations (both behavioral and cognitive/attitudinal) that organize and guide an individual's reproductive effort (e.g., a high quantity versus a high quality strategy), whereas a reproductive tactic is a specific act or behavior that promotes mating in some way. A broad reproductive strategy will generally flexibly employ numerous specific behaviors or tactics. The current study measured numerous variables related to mating and sexual behavior in a sample of 180 undergraduate women. The interpretation of an exploratory analysis indicated two factors. One factor was consistent with the reproductive strategy construct and was comprised of sociosexual orientation, self perceptions of sexual commitment, variety of sexual experiences over the lifetime, and number of sexual partners. The second factor was consistent with the reproductive tactic construct and was comprised of mating tactics and current sexual behavior. These data therefore suggest that strategic and tactical reproductive behaviors are separate constructs both between and within individuals.

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Poster 02

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MUSIC: A SEXUAL CUE IN MATE CHOICE? - CLUES FROM AN INTERNET DATING SERVICE

"Human music shows all the classic features of a complex biological adaptation" (Miller, 1999, p. 329) and "we may assume that musical tones and rhythm were used by our half-human ancestors, during the season of courtship" (Darwin 1871, p.880).

Music was often claimed to be a sexual cue by evolutionary psychologists. But is there any experimental evidence for this?

If "making music" is a cue for male fertility, we would expect men to display this feature more often than women do. In contrast, we would expect "listening to music" to be displayed the same in both sexes. I present data collected from an internet dating service to show sex differences in music production and consumption. The data reveal a sex difference in the feature "making music": men indicated more than three times as much as women they would "make music" in their spare time. At the same time, "listening to music" is found to be an evenly distributed feature across sexes. This might indicate the importance of male musical ability in mate choice.

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Poster 03

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SEXUAL AND EMOTIONAL JEALOUSY: ADAPTATION OR MEASUREMENT ERROR

Several criticisms were addressed to the evolved sexual dimorphic pattern of jealousy. We report the results from three data sets collected in university students. In the first sample, $n=613$, two types of continuous measures of sexual and emotional jealousy were used. With reliable factor analytical derived measures, evolutionary predictions, controlling infidelity and relationship factors, were supported, whereas with unreliable item measures, evolutionary predictions were not confirmed. For categorical measures of sexual jealousy we report data from two samples, $n=302$ and $n=190$. These samples were tested on six dilemmas which assessed how difficult would be to forgive or break up a relationship due to the nature of the infidelity. In the first sample, participants were exposed to a two choice format, sexual and emotional jealousy, whereas in the second they had a three choice format, sexual, emotional or both forms of jealousy. The results in these two samples supported evolutionary predictions, even though the different measures produced different results. Jealousy, in both sexes, is affected by several experiential variables and is also related to the measurement method used, but it seems that independent of this variation, males are more disturbed by sexual infidelity and females by emotional infidelity.

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Poster 04

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CONTEXTUAL EFFECTS IN JUDGMENTS OF ATTRACTIVENESS

The methodology in attractiveness studies varies, with some studies requiring subjects to rate sequentially presented images using an arbitrary scale of attractiveness and others requiring subjects to pick the most attractive of two or more simultaneously presented images. Until recently there has been no reason to believe that the size and composition of the image set used in such experiments should affect relative attractiveness judgements. However, results from the consumer psychology literature challenge this view. For example, it has been found that the addition of a third, less attractive option to a two-item choice set can alter preference for the original two options in human shoppers making choices between different brands of products such as tinned beans, batteries or beer. This robust phenomenon, known as the asymmetrically dominated effect, occurs when the options differ in at least two different attributes of interest to the chooser (such as price and quality). Since multiple dimensions of shape are known to be involved in body attractiveness ratings, we tested whether the asymmetrically dominated effect might also occur in judgements of the attractiveness of female bodies. We used a set of images of female bodies manipulated to differ in two dimensions that have previously been established to effect attractiveness. We compared the relative attractiveness of two target bodies presented either simultaneously as a pair, or in the presence of a third, less attractive body. We discuss the implications of our findings for models of decision-making and the evolution of mating strategies.

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Poster 05

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EVOLUTION FROM QUANTA TO MINDS: THE INTERMEDIATE ROLE OF CLASSICAL REALITY

Mental phenomena share many attributes of quantum physics. In each domain, putative “states” are intangible, but profoundly useful to predicting observable behaviors probabilistically and managing them. Phenomena are quantized on small scales, and on large scales cohere into webs of mutual entanglement that “decohere” into objective “facts” whenever an unequivocal decision or measurement is made. Despite this analogy, minds can not have evolved directly from quantum realities. Evidence shows that a quasi-Newtonian classical “Reality” is a necessary intermediate. The Darwinian algorithm can apply only where lawful behavior within extended space and time provides useful approximation. The phenomenology of mathematics arises from interaction between classical reality, individuals’ perception, and social consensus -- only then pointing beyond these foundations. The role of classical reality is clarified further through understanding information as a measure of selective attention-inattention that is concurrently subjective and objective. Quantum-like aspects of mental realities are understood and predicted through understanding “minds” as shared self-deceptions that evolved by optimizing social cooperation among organisms with conflicting interest, then selected further through the computational advantages of quantum-like systems. Implications follow. Fundamental physics is informed non-causally through constraints imposed by the human brain as informational filter. Mental health practice is improved by utilizing the context-dependence of mental realities, modulating them through probabilistic interventions that resemble quantum technologies. Finally, understanding the deceptive aspects of human mentation will help lift myths and taboos that impede global cooperation, improving cooperative discourse in the interest of species survival.

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Poster 06

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THE PERCEIVED CONSEQUENCES OF INFIDELITY: GENDER DIFFERENCES

Previous research has found gender differences in the type of infidelity (sexual or emotional) that is most upsetting. Both evolutionary theory and social construction theory suggest mechanisms that can account for these differences. The purpose of this study was to explore what men and women believe is likely to happen as a result of either sexual or emotional infidelity, and to examine whether or not those beliefs are different for individuals who are in long-term committed relationships. Eighty-three male and female undergraduate students indicated the likelihood of nine potential consequences to either perceived sexual or emotional infidelity by their partner. The independent variables were sex of the subject, type of infidelity, and whether the relationship had lasted more or less than 2 years. There were several statistically significant interactions with length of relationship that supported an evolutionary interpretation of the data. Men in longer-term relationships were more likely to indicate that their partner would have a child with the other person, especially when sexual as opposed to emotional infidelity was involved. Additionally, both men and women who had been in longer-term relationships were less likely to believe that emotional attachment would lead to sex. Men in the emotional infidelity condition were less likely to believe their partners might leave them than were women in either condition, or men in the sexual infidelity condition. Finally, women were more likely to believe that their partners would give monetary support to the other person when there was emotional infidelity.

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Poster 07

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THE HUMAN MATING SYSTEM — AN APPROACH BASED ON CRANIAL SEXUAL DIMORPHISM

As an adaptational response to the environment a specific social system and hence a specific mating system establishes in each taxon. Within this system sexual selection forces certain competitive strategies in both sexes to obtain reproductive success. This selection pressure favors divergent morphology of males and females. Thus, an effect of the type of mating system on sexual dimorphism is assumed to exist. By determining the faciocranial sexual dimorphism, the mating system of humans shall be illuminated in this study, closely related extant hominoids being used as a reference. Pongids are generally restricted to their habitats and thus, evolved a specific mating system, whereas modern humans adapted to various habitats which lead to the implementation of several types of mating behavior.

It is thought that polygynous taxa (*Gorilla* and *Pongo*) show a greater amount of cranial sexual dimorphism than polygamous taxa (*Pan*) because of their higher level of male intrasexual competition. *Homo sapiens* is expected to show a medium-sized sexual dimorphism because of its variability in mating systems. The material consists of 268 crania of five hominoid taxa (*Homo sapiens*, *Pan paniscus*, *Pan troglodytes*, *Gorilla gorilla* and *Pongo pygmaeus*). 3D co-ordinates of 96 landmarks on each cranium were digitized with a Microscribe 3DX™ Scanner and analyzed using Geometric Morphometrics. In all five taxa significant size-related sexual dimorphism is found, varying in its extent though. The pattern of sexual dimorphism — expressed by the degree of allometric growth — reflects the different strategies that have evolved due to sexual selection.

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Poster 08

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SYMMETRY PREFERENCE IN UNFAMILIAR HUMAN FACES

Following Little and Jones' study (2003), we tested preference for symmetry in judging attractiveness of human faces. We tested the two main explanatory hypotheses for symmetry preference: the evolutionary theory, which predicts that symmetrical mate relevant stimuli will be preferred because they signal good genes, and the perceptual bias theory, which predicts that symmetry is preferred because symmetrical stimuli are close to our prototypes and are processed faster than asymmetrical ones. In this study, participants were showed pairs of faces of unfamiliar persons. Each pair was made up of a target face and a hyper symmetrical manipulated version of the same face. Each pair was seen twice (once in upright orientation and once in inverted orientation). The participants had to judge for each pair which image was the most attractive. The attractiveness of the faces had been evaluated by independent judges. Results showed that participants found symmetrical faces in upright orientation more attractive than symmetrical faces in inverted orientation. Moreover, a preference for symmetrical upright opposite-sex faces was found. These data are consistent with Little and Jones' results and are more consistent with the evolutionary theory than with the perceptual bias hypothesis: no preference was found for symmetrical inverted opposite-sex faces.

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Poster 09

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CHANGES IN PERSONAL ATTRIBUTES DUE TO FACIAL SURGERY

Human assessments of beauty and human beauty standards have attracted considerable attention in recent years. With the development of plastic surgery the desired and admired features of human beauty can be acquired in a more permanent state as compared to the temporary state of cosmetics. Plastic surgery makes it possible to manipulate traits towards an ideal that is considered to be generally beautiful and a reliable indicator of health and fertility to a large extent. We investigated whether facial surgery due to progenia alters facial symmetry and, as a consequence, attributes towards faces.

Pre- and postoperative photographs of male and female subjects were rated for attractiveness, sexiness, likeability, dominance and self-confidence. Fifty-one anthropometric landmarks were placed on the facial photographs. Facial horizontal symmetry was analyzed by means of Geometric Morphometrics methodology. Subjects received significantly higher ratings for sexiness, likeability and attractiveness after surgery. Symmetry did not change significantly due to surgical corrections and was not associated with facial attributes neither for pre- nor for postoperative faces. The variance of the anthropometric landmarks was significantly lower after surgery. We therefore assume that the positive effect of facial surgery is caused by average rather than symmetry.

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Poster 10

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RIGHT-LEFT DIFFERENCES IN DIGIT RATIO AND THEIR RELATIONSHIP TO FERTILITY IN WOMEN

The ratio of the length of the 2nd and 4th digit (2D:4D) is thought to be negatively related to prenatal testosterone and positively related to prenatal oestrogen. In addition there appears to be a right/left effect in 2D:4D such that individuals with low D r-l (right 2D:4D-left 2D:4D) are more prenatally androgenised than individuals with high D r-l. Here we consider the relationships between D r-l and parameters of fertility in a sample of Polish women (n=104) recruited in the Poznan area. We found that D r-l was not related to age, height or weight. With regard to fertility D r-l was not correlated with age at menarche, age at menopause or with numbers of children. However there was evidence that D r-l was negatively related to age at childbirth and this trend was significant for the 2nd and 3rd child. We conclude that women who have been prenatally exposed to high levels of testosterone have children later in life than women who experienced low prenatal testosterone.

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HOW ATTRACTIVE AM I? SELF-RATINGS OF ATTRACTIVENESS CORRELATE WITH THE RATINGS OF OTHERS

In mate selection, it is important to be able to attract the best possible mate. Physical attractiveness is particularly important for women; optimal mate-seeking strategies may depend on a woman's ability to predict her attractiveness to potential mates. We know how a number of traits affect attractiveness, including waist/hip ratio, body mass index, and facial symmetry, but we do not know whether women can process these traits to estimate their own attractiveness and thus their mate value. We measured how

attractive women thought they were by administering a questionnaire to 31 women, ages 18-25, obtaining separate estimates of perceived self-attractiveness, body satisfaction, and self-predicted attractiveness to others. We also measured body mass index, waist/hip ratio, and the amount of effort they invested in their attractiveness. Photographs were made of each participant, taken in frontal perspective from the neck down, to measure waist/hip ratio and to allow other participants, both male and female, to rate their attractiveness. Self-ratings of attractiveness, combined from the attractiveness scale, the body satisfaction scale, and the attractiveness prediction scale, correlated highly ($r=0.84$) with the attractiveness ratings of others based on the photographs. Thus, women could accurately predict how attractive other people, both male and female, would find them, even without using facial features. We also replicated several known effects, including a high correlation of males' and females' estimates of female attractiveness from the photographs ($r=0.82$), as well as an effect of body mass index on attractiveness ratings by others ($r=-0.61$).

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KIN ALTRUISM AND ATTRACTIVENESS: A RELATIONSHIP

This study examined perceptions of helping in emergency situations among family members. Those perceptions were correlated with perceived attractiveness ratings of the same family members. Those with a higher genetic relatedness were more often saved ($P<.05$). Of those who were of equal genetic relatedness, the one rated as more attractive received help more often ($P<.05$).

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SEEK ATTRACTIVE OR AVOID UGLY: POSSIBLE ADAPTATIONS IN PERCEPTION OF ATTRACTIVENESS

Studies such as those conducted by Rhodes, Crawley, and Zebrowitz (2002), Cunningham, Barbee, and Philhower (2002), and Rhodes and Halberstadt (2000), have attempted to look at attractiveness from evolutionary, biological, and social perspectives. Common findings in these studies have demonstrated that human beings are generally more attracted to symmetrical faces displaying non-average sexually dimorphic hormone markers. There currently exists evidence that a universal standard of attractiveness exists. The idea that symmetrical faces are considered attractive has been thought to have both biological and evolutionary basis (Rhodes, Harwood, Yoshikawa, Nishitani, & McLean, 2002). This brings us to the point: Are individuals attracted to features that display symmetry, youth, and sexually dimorphic hormone markers – or in other words, is it an adaptation for us to seek out these attractive features or rather, to avoid those features that may detract from biological fitness, or a combination of both? Participants were given less than two seconds to view a picture and choose what feature of a face first caught their attention. The participants then were able to view the face again and rate the face on attractiveness. After a set of 25 pictures, participants were asked to review all the faces and indicate whether that feature that first caught their attention contributed to or detracted from the perceived attractiveness of the individual in the picture. Results indicate that people tend ($P<.05$) to see those features that detract from attractiveness indicating a possible avoiding adaptation to those features that indicate poor health.

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SAME STRESSES, DIFFERENT RESPONSES: FIGHT OR FLIGHT AND TEND AND BE FRIEND

Fight or flight is assumed to be a universal stress response. However, different evolutionary pressures may produce different adaptations in males and females. Taylor et al. (2000) hypothesised that males fight or flight and females tend and be friend. We developed six dilemmas to test this differential response to stress provoking situations in a sample of 76 males and 103 females, mean age 22.24 (SD = 2.2), who were asked to rank their reactions, according to four categories: fight, flight, seek support, and offer protection. In the three stress provoking situations that involved physical threat integrity, men reported a fight response as first reaction and a flight response as their last choice reaction. Women reported the opposite pattern: first, a flight response and, only as last choice, a fight response. For the three stress provoking situations that involved a threat to the participants social status, a tend-and-be-friend pattern was found, although men and women behaved differently: men's first choice was offering protection and last choice involved seeking support. For women, the opposite pattern was once again found; they reported as first reaction seeking support and last reaction, offering protection. Fight response correlated positively and significantly with masculinity, short-term orientation and risk attitudes, whereas flight response correlated negatively with masculinity and risk attitudes. These results imply that evolutionary pressures shaped different male and female stress responses.

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ASIAN EVIDENCE FOR DIFFERENTIAL PARENTAL INVESTMENT FROM GRANDPARENTS

The care for one's grand children benefits a person's inclusive fitness only to the extent that such care promotes the survival of genetic kin. Thus, parental care of grand children is more likely to occur in a context that ensures genetic relatedness than one that does not. Empirical comparisons of maternal with paternal grand parenting have been used to test and the results from many Western societies support this contention (e.g., Euler & Weitzel, 1996). To the author's knowledge, similar work has not been conducted in Asian countries. Because contemporary Asian countries are more patriarchic and less gender egalitarian than Western countries (Chang, 1999), evidence from such a context may provide more convincing argument for the evolutionary views. The purpose of the present study is to compare parental warmth perceived of maternal with that of paternal grandmothers' in a sample of Chinese children.

The sample consisted of 151 fifth grade children (female = 44%). Eight parental warmth items were adopted from Parental Acceptance Rejection Questionnaire (Rohner, 1986) with satisfactory internal consistency reliability of .78. Children rated parental warmth in relation to their maternal and paternal grandmothers. The results showed significantly higher perceived parental warmth from maternal (M = 5.87) than paternal grandmothers (M = 5.45, $t = 2.05$, $p < .05$). The children were also asked with which grandmothers they felt close. One hundred and one or 67% chose maternal grandmothers. Binomial test was significant. These results provide strong Asian evidence for the parental investment theory.

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DISGUST: A MODEL SYSTEM FOR INTEGRATING PERSPECTIVES ON EMOTION

In earlier work, we showed that disgust evolved to steer the behaviour of organisms away from pathogens and parasites in the environment. In this paper we propose disgust as a model system for defining and understanding the evolution of emotions. Following Tinbergen we outline the mechanisms, functions, ontogeny and phylogeny of disgust, using evidence from neuroscience, animal behaviour, evolutionary psychology and our own data on human disgust reactions. We present data showing that humans find objects displaying cues to potential disease threats more disgusting than paired stimuli representing a lesser threat. The phylogeny of disgust shows analogies to disgust responses in animals as simple as *C.elegans*. If other emotions function in a similar way then it follows that: emotions are functionally equivalent to EP modules; they are common in animals; they have associated faces only when communicating emotion is adaptive; and they have associated feelings only when this serves learning and future planning.

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Poster 17

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CASTE AMONG GYPSIES IN SERBIA: IT'S OUR BLOOD THAT MAKES US ROMA

Gypsies form a complex mixture of groups with a strongly emphasized antagonism between the groups. Among Serbian Gypsies, the "caste" system is still largely in use, along with a self-made hierarchy between the groups. These "caste" behaviors have found their main manifestation in the "match" in marriage and social hierarchy. Based on original field-work in Serbia, this paper will argue that the evolutionary success of these behaviors is due to their effect in preserving local/village traditions and distinctiveness.

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TOOLS, CUMULATIVE CULTURE, AND THE HUMAN CULTURAL NICHE

Artefacts play a critical role in all human cultures. Even in societies with a limited technological level they constitute the world we live in. Humans heavily rely on artefacts for their subsistence and other aspects of their lives since the appearance of the first stone tools (the Oldowan), c. 2.6 myrs ago. This has led some evolutionary theorists to speculate that members of the genus *Homo* occupy a cultural or cognitive niche, i.e. they have cultural solutions to many adaptive problems instead of mental and anatomical traits evolved by natural selection.

The first part of the presentation will explore the dynamic relationship between the adaptive benefits of artefacts for early hominids and the cognitive adaptations that favoured the emergence of stone-tool making. Drawing on data from cognitive archaeology, neuropsychology and developmental psychology, I will show that the fitness-consequences of stone-tool making in hominids has led to a host of modules dedicated to the production of stone tools, such as mental rotation, a disproportionate amount of neural space for the coordination of the fingers, the ability to read other people's intentions underlying their motor-actions and executive function.

In the second part, I will address the question as to why tool-making and cumulative culture are rare in nature, if they have such clear adaptive benefits for humans. I will draw on data from palaeoanthropology and mathematical models to explain why natural selection can only favour culture in very specific conditions.

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(S)HE LOOKS NICE!: MEASURING OPPOSITE SEX ATTRACTION

Introduction: Sexual selection theory predicts that human males evaluate females more on markers of facial beauty, youth and fecundity than on markers of wealth. Conversely, it is predicted that human females evaluate males more on those characteristics that index wealth, power and social dominance. The main aim of this study was to test these hypotheses. But, unlike the majority of previous studies, which have tended to employ trait rating scales, this study used media images.

Methods: Data was collected from 25 heterosexual male and 25 heterosexual female volunteers. Participants were asked to rate the attractiveness of images of 4 men and 4 women. For each sex there was a rich/attractive, a rich/unattractive, a poor/attractive and a poor/unattractive image.

Results: Male participants showed a preference for the images of women categorised as attractive over the images categorised as unattractive, irrespective of whether they were rich or poor ($X(3) = 68.28$, $p < 0.01$). However, the male participants preferred the rich/unattractive woman image to the poor/unattractive women image. Female participants preferred the image of the rich/attractive man significantly more than any other image ($X(3) = 53.13$, $p < 0.01$). However, contrary to the hypothesis, female participants preferred the poor/attractive and poor/unattractive men significantly more than the rich/unattractive man.

Discussion: The results of this study only partially support the predictions of sexual selection. Of particular interest is that male participants showed a preference for wealth when shown images of unattractive females. However, in contrast to previous studies, female participants showed a preference for attractiveness over wealth and this finding is better explained by socio-cultural theory.

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THE EFFECTS OF HUNGER ON DISGUST SENSITIVITY

The capacity to experience disgust is thought to have evolved in order to reduce the risk of pathogen transmission, as disgust a) is elicited by cues indicative of disease risk, b) motivates avoidance of contact with eliciting stimuli, and c) reduces oral incorporation in the presence of eliciting stimuli. While providing the benefit of behavioral prophylaxis against disease, disgust necessarily increases dietary selectivity, as it reduces the number and type of items ingested. Because dietary selectivity comes at the cost of increased time and energy spent foraging, we therefore expect the ease with which disgust is elicited to be adjusted as a function of the organism's current ability to incur these costs. Hence, congruent with the folk model of disgust, we predicted that hunger should attenuate disgust sensitivity. Using a cross-sectional design, we tested this prediction by administering the Haidt Disgust Scale to subjects before or after a meal. Preliminary results support the hypothesis, but are qualified by a sex difference in the effects of hunger on disgust sensitivity.

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WHY WE TRAVEL – HUMAN MOBILITY IN AN EVOLUTIONARY PERSPECTIVE

Mass phenomena, such as tourism which has increased in the last 50 years to more than 700 million tourist arrivals in 2002, are suspected of being genetically caused or favoured. Since travelling is not known among apes or australopithecines, the most parsimonious explanation is the genetic fixation of specifically human mobility within the last two million years in the lineage to modern humans – probably with the emergence of hunting.

If this is true, increased mobility must have resulted in considerable advantages which outweighed inevitable disadvantages like accidents, criminality, disease, uncertainty of accommodations and endangerment of social connections and property at home. Culture is advanced and maintained through interchange, which would be impossible without mobile behaviour. Thus, human mobility may have increased with the evolution of culture as a predisposition of the latter. Mobility is also advantageous in hunting, warfare, escaping natural catastrophes, and changing environments. It also kept epidemics out of the Palaeolithic world.

To test the hypothesis of a genetic basis for human mobility, we looked for tendencies towards mobility under predominantly settled conditions following neolithication. Our hypothesis is corroborated by the unexpected amount of mobility found in many different societies and historic epochs throughout the ages. Furthermore, human mobility has strong advantages even in our settled modern world, particularly in promoting culture.

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ON THE PRIMACY OF BIOLOGICAL MOTION (PERCEPTION)

Evolutionists have to accept that man ultimately evolved from pelagic fish. Because for animals in general essential resources (and threats) depend on (or, most often, are) other animals, early categorisation of other individuals as predator, prey, partner, competitor or neutral was the basic task for vertebrate cognition. If, after S. Harnad, cognition is essentially categorization, "early" cognition must be early (event) categorization, and for animals and man biological motion perception will do exactly that.

Some famous points are presented, amongst them:

Saliency in attention: (i) We can't but watch a jumping point of an electrocardiograph monitor if we only casually enter an intensive care unit and (ii) in psychology textbooks we would immediately recognize the Dalmatian dog amongst seemingly random spots, if "he" moved just a bit.

Binding(?): (i) Ten moving points will show a human walking, in some cases his sex, age and mood, too (G. Johansson) and (ii) humans readily interpret certain drawn lines as (the path/trace of a) human walking around, in a certain mood (R. Tagiuri)

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USE OF PERCEPTUAL SCALES, K-MEANS AND EM CLUSTERING ON INFANT CRY CLASSIFICATION; ADDITIONAL SUPPORT FOR INFANT CRY AS A GRADED SIGNAL

Infant crying is considered a signal, soliciting attention. Against the 'cry types' hypothesis, the hypothesis of infant crying as a graded signal, reflecting urgency levels, has gained acceptance. Under this model, Lenti-Boero (1998) proposed that the first hunger cry after previous meal is usually of low urgency, that the pain cry (blood-withdrawal) is high, and that the 'manipulation' cry (Moro reflex test) expresses mid-urgency. As part of a study of sexual differences in infant cry discrimination, perceptual scales and cluster analysis were used to selectively validate cry samples on three distinct urgency levels. 30 hunger, manipulation and pain neonate cries (N=10 each) were evaluated by 185 adults (90 females) on five 7-point Likert scales (urgent/not-urgent, stressing/non-stressing, healthy/sick, vigorous/weak, attend/avoid). Standardized mean scores for each cry and scale were used in K-means and Expectation-Maximization (EM) clustering (user-defined number of 3 clusters). In both analyses cluster assignment of cries was identical: cluster-1 included 6-hunger, 5-manipulation and 4-pain; cluster-2, 3-hunger and 4-manipulation; cluster-3, 1-hunger, 1-manipulation and 6-pain. Cluster-3 resulted clearly pain-centered; on the other hand, cluster-1 was only hunger-biased and cluster-2 manipulation-biased. K-means reported cluster-1 was defined by middle-scale values on all five perceptual scales; cluster-2 by four low-means (health was high) and cluster-3 by four high-means (health, low). EM uses cluster membership probabilities. The pattern of cry-cluster assignment sharpened as we kept only cries over stringent p-levels: at $p > 0.99999999$, cluster-1 only included 2-hunger cries; cluster-2, 2-manipulation, and cluster-3, 4-pain. Results support the graded signal hypothesis, but contradict 'manipulation' as a mid-urgency cry.

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THE PERCEPTION OF FEMALE PHYSICAL ATTRACTIVENESS WITH CHANGING OBSERVER AGE

Evolutionary psychologists have suggested that judgments of female physical attractiveness are based upon cues signaling her health and reproductive potential. Two such cues include shape, measured by the ratio of the width of the waist to the width of the hips (the waist-hip ratio or WHR), and body fat composition, often measured by body mass index (BMI - weight scaled for height in units of kg/m²); both are closely linked to health and fertility. Previous studies have used observers drawn from a narrow age range (usually corresponding to a student population). If attractiveness judgements are part of a pre-determined mate selection strategy, these judgements may change as people age and factors in their reproductive success alter. Further, if the perceptions of attractiveness are a cultural construct, rather than a product of evolutionary processes, then it may follow that people of older generations may have a differing perception of attractiveness, reflecting a change in cultural preferences over time. 108 male and female Caucasian subjects aged 18-87 rated 50 photographic images of female figures dressed in grey leotards. The women in the photographs varied in BMIs and WHRs. There was no difference in the way male and female observers rated the images. No effects of the age of the observer on perceptions of attractiveness as a function of either BMI or WHR were found. This suggests that such perceptions remain stable throughout life and is consistent with these preferences as hard wired psychological adaptations.

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HAS NATURAL SELECTION SHAPED OUR PURCHASE DECISIONS?

The advertising industry is immense: a mass of advertising exists all around us, attempting to exert an influence over our purchase decisions. We can be affected by these messages in many ways: consciously and subconsciously, positively and negatively. But exactly how does advertising manipulate our behaviour? There obviously exists a fundamental goal to make people aware that a particular product or brand exists, but ultimately, advertisers are fighting for increased sales, and so their advertising must have some effect on consumer attitudes and accordingly on their behaviour, but how may natural selection play a part?

Eye-tracking methodology can be used to pinpoint reasons behind consumer attitudes towards advertising, and the subsequent impact this has on brand choices. Such measurement has been used within a cognitive processing study into advertising effectiveness to identify consumer 'search patterns': ways in which consumers seek out information within an advert during exposure. It appears that consumers target areas of the ad which supply the most information first, this generally being the textual content. Once the message of the ad has been identified, consumers tend to spend a large proportion of the remaining exposure duration attending to pictorial information which further explains the ad meaning but also provides an opportunity for consumers to enjoy the ad and form personal opinions on the ad as a whole. Thus consumers almost appear to display a type of foraging behaviour, and such findings are another example of the links being made between evolutionary psychology and consumer behaviour.

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SIZE NOT SHAPE PREDICTS FEMALE BODY ATTRACTIVENESS

Singh (1993) and Henss (2000) have shown that Waist Hip Ratio (WHR) is a strong predictor of the attractiveness of female bodies. Their work involved altering line drawings and photographs, respectively, of women's bodies and altering the waist size so as to change the apparent WHR. Tovee et al (1999) pointed out that this alteration also affected the apparent body mass index (BMI, weight scaled for height). Using unaltered photographs of a number of women, they found that BMI was much the most significant factor, with little effect of WHR once this had been allowed for.

Streeter and McBurney (E&HB 2003) used the Henss style of altered photograph and asked their participants to estimate the weight of the person depicted. They found that, indeed, the weight estimate accounted for the majority (66%) of the variance, but even after this had been partialled out there was a distinct preference for a WHR of 0.7. However, their apparent WHR varied from 0.5 to 1.2 which is a very large range. We repeated their study, using 30 unaltered photographs of women in the normal range of WHR and BMI. Estimated weight accounted for 79% of the variance, WHR for 5%. Even this small correlation completely disappeared when the effects of weight were partialled out. It therefore appears that, using unaltered photographs of natural female body shapes, any effects of WHR on attractiveness are completely dominated by BMI, at least for this sample of Scottish students.

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FROM CHARLES DARWIN TO DAVID BECKHAM-THE EVOLUTION OF HUMAN STATUS

It is argued that status in humans is derived from an evolved process of social exchange, whereby individuals whose actions (deliberate or accidental) promote group welfare receive prestige in return, which gives them priority access to scarce resources. Status differences emerge as a result of individual variation in contributions to important public goods—goods that once provided nobody in the group can be excluded from. Several types of goods can be distinguished, each with its own status psychology: 1) group defence; 2) in-group harmony and; 3) new resource opportunities. As these goods are costly to provide (but are beneficial to the whole group), status is awarded to those who provide them. In various studies, we tested this public goods theory of status.

The first archive study used data from the BBC's nationwide '100 Great Britons' poll held in 2001, which asked people to nominate the greatest Briton of all time. Results from 30,000 nominations provided support for our theory—the 100 Britons fell neatly into the three 'public goods' categories. For example, the top three were, 1) Winston Churchill (group defence); 2) Brunel (new opportunities); 3) Princess Diana (in-group harmony). Other evolutionarily relevant findings were that men were over-represented in all categories and that group defence was the most highly represented category.

The second experimental study used a public goods dilemma to examine the emergence of status differences within small interacting groups. Results support the public goods hypothesis. Members who contribute more to their group were valued more and were more likely to be chosen as the group representative.

In the discussion, we address implications of the public goods hypothesis of status.

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EFFECTS OF FEMALE FERTILITY RISK AND RELATIONSHIP STATUS ON SELF-PERCEPTION OF ATTRACTIVENESS AND DRESS STYLE

Most studies in Evolutionary Psychology which have tested the effects of fertility risk on female behaviour have focused on female mating choice – but there is still a lack of empirical findings regarding intrasexual competition between women. This study tested the occurrence of changes in self-perceived attractiveness and dress style across the female menstrual cycle. We hypothesized that self-perception of attractiveness and clothing style of females (as an adaptive strategy of intrasexual competition) increase during the high fertile phase of their cycle. We also suggest that these effects only occur in women with a long-term partner and not in singles (in case of a pregnancy singles are at greater risk of not receiving encouragement from a partner, and as a consequence may have greater costs of reproduction than women in a long-term relationship).

Forty-one women who were not taking any hormonal contraceptives (aged between 18-36 years: 19 singles, 21 with a long-term partner) were tested in a longitudinal study carried out over 31 days. The results show an interaction between fertility risk and relationship status on self-perceived attractiveness and sexy clothing style: Women with a long-term partner felt significantly more attractive and judged their clothing sexier during their highly fertile days than the singles. There was no menstrual cycle shifting of self-perception for the single women. To conclude, these findings maintain the importance of the influence of the female menstrual cycle and relationship status on sexual strategies.

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EDUCATION EFFECTS OF RESTORATION OPTIONS– RATIONAL MAN VERSUS THE SAVANNAH HYPOTHESIS

Ecological restoration/protection often requires significant alteration of existing environmental conditions, which require support from stakeholders, including visitors and residents. Acceptance of restoration options may be contingent upon a number of factors, including perceptions of the aesthetic qualities and knowledge of the ecological benefits of existing and proposed environmental conditions. This study investigated the effects of ecological information/education on perceptual evaluations of woodland sites. Although educational mediums are thought to be sufficient to override aesthetic preferences, evolutionary theory predicts humans have strong aesthetic preferences for environments that afforded human survival such as harm avoidance, shelter and favorable food sources. The most preferred natural landscapes typically possess semi-open areas with low ground cover, water sources directly or indirectly apparent, and scattered clumps of trees and shrubs, a configuration consistent with high-productivity savannahs, ergo the "savannah hypothesis". A computer-administered survey presented digital images of 45 sites, ranging from relatively open savannah to dense woodland, to separate groups of college students who provided ratings of either perceived scenic beauty or acceptability (of environmental policy outcomes). Subjects in all conditions exhibited strong positive correlations between scenic beauty and policy acceptance ratings. In spite of the education manipulations intended to foster differential preferences for more open sites versus more dense sites, correlations were uniformly strong and positive between savannah and woodland instructed groups and between education and non-education groups for both scenic beauty and acceptability ratings. This finding supports the notion that in spite of education supported by the "Rational Man" approach, evolved landscape preferences prevailed.

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OUT-GROUP EXCLUSION OR CHEATER DETECTION? WHEN TWO PROBLEMS COEXIST

In order to maintain cooperative relationships, dealing with non-cooperators is crucial. For instance, in cooperative groups, it is important to exclude out-group members from benefiting in collective action. In dyadic social exchange, it is critical to detect cheaters. Sometimes, however, the two problems coexist and require different solutions. By using the Wason selection task, we examined what happens in such a situation.

In study 1, the context of Wason selection task was that Bob, a member of the Blue-group, bought a keg of beer using the group's fund. Then, Bob had to follow the rule, "If one is from Blue-group, one gets the beer." If respondents took the situation as collective action, they would think that Bob should not give any beer to out-group members (out-group exclusion). If they took it as dyadic social exchange, they would think that Bob had to give beer to Blue-group members (cheater detection). Results showed that most respondents took the situation as the former.

In study 2, the context was that all of the Blue-group members independently bought beer from Bob. Since no one from other groups bought beer, the same rule "If one is from Blue-group, one gets the beer" was stated. The results showed that again, most respondents took the situation as collective action, even though the context depicted dyadic social exchange between each Blue-group member and Bob. Implication of strong out-group exclusion tendency in the evolution of cooperation and altruism will be discussed.

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THE EFFECT OF FACIAL EXPRESSIVENESS ON PERCEPTIONS OF PHYSICAL AND INTERPERSONAL ATTRACTIVENESS

Previous research has found that emotional expressivity and physical attractiveness are mediators of initial interpersonal impressions. Boone and Buck (2003) proposed that emotional expressivity may act as a marker for cooperative behavior or trustworthiness. Thus, it may be adaptive to be attracted to individuals who display their emotions spontaneously, openly, and accurately. The purpose of the present study was to evaluate the independent contributions of physical attractiveness and emotional expressivity to judgments of interpersonal attributes and abilities. 165 photographs of 55 different faces, each displaying three emotional expressions, were shown to three independent panels of raters. Faces were judged for: a) expressivity (intensity and accuracy of the expression), b) physical attractiveness, and c) interpersonal impressions (social competence, concern for others, integrity, adjustment, and social potency). It is hypothesized that interpersonal impressions will be more positive for faces judged as physically attractive and emotionally expressive. In addition, physically attractive individuals will be perceived as higher in social competence and social potency, whereas emotionally expressive individuals will be perceived as having greater integrity and concern for others. [Data is currently being analyzed].

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WHAT DO FACIAL "EXPRESSIONS OF EMOTION" CONVEY? EVIDENCE FROM FREE RESPONSES

Facial displays of anger, disgust, fear, happiness, sadness, and surprise are widely regarded as evolved social signals. In contrast, less agreement exists concerning the message conveyed by the signals. While some studies treated facial displays mainly as signals of feelings, others have urged that they also be considered as signals of behavioural intentions and action requests. It is still unclear, however, as to what specific intentions and requests are inferred from facial displays. In an attempt to empirically address this question, free responses were collected in the course of an earlier study [Horstmann, 2003, *Emotion* (3), 150-166], and are reported here for the first time in detail. In particular, participants describe in their own words what a depicted person feels, intends, or wants the observer to do. The results show conformity and discrepancies to predictions derived from the literature.

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FOREVER YOURS: A CONTENT ANALYSIS OF MATE CHOICE DIFFERENCES IN PERSONAL ADS FOR LONG-TERM MARRIAGE PARTNERS

Personal ads seeking long-term marriage partners from 122 editions (each with approximately 40 ads) of a Croatian newspaper "Plavi oglasnik" are used to test an evolutionary hypothesis and predictions about long-term human mate preferences. Individual trait information (offers/appeals) in ads was coded using a four-category system of descriptors (adjectives): dispositions, behavioral impressions, socio-economical aspects and physical characteristics of persons. Dispositions (personality descriptors) were coded in personality dimensions using a Croatian taxonomy of personality descriptors according to the Big-Five model of personality. Research has shown important individual sex differences in long-term mate choice,

consistent with those predicted by the evolutionary theory of sexual selection, in personality dimensions as well as in other categories of human characteristics.

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THE STRUCTURE OF SEX DIFFERENCES IN PREFERENCES FOR LONG-TERM AND SHORT-TERM MATES

The existence of sex differences in preferences of certain characteristics of a potential mate is well established, while their structure was not sufficiently explored. Therefore, the aim of this internet-based study was to identify the structure of sex differences in human mate preferences, depending on the type of relationship the participants are currently looking for. 2657 heterosexual subjects (939 males and 1616 females) completed the questionnaire which requested their biographical data, including age, sex, marital status, income, education, etc., their current preference for a long-term vs. short term relationship, as well as their ratings of importance and desirability of 18 characteristics of a potential mate (drawn from the Buss et al., 1990 study) on a four-point scale. Two separate discriminant analyses were performed in order to establish whether the structure of sex differences differs between subjects seeking short-term vs. long-term relationship. As predicted, the mate characteristics mostly contributing to the differentiation between sexes were not the same in the group of long-term relationship seekers as in the group of short-term relationship seekers.

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HUMAN MALE MATE GUARDING AND ITS LINK TO FEMALE FERTILITY STATUS

A woman can increase her reproductive success by extra-pair copulations but the consequences are reproductively costly for her primary partner. A man who is able to avoid his partner's infidelity, will gain an evolutionary benefit. Thus, to retain a partner and to avoid partner having extra-pair copulations, mate guarding strategies have evolved. Because for the primary partner mate guarding is of cyclical reproductive relevance, we assumed from the male ability to track female fertility status and from the efforts of permanent guarding that a cyclical pattern in intensity of mate guarding exists. We hypothesized that the intensity of primary partner's mate guarding changes throughout the menstrual cycle and it is most prominent within the most fertile period of the menstrual cycle. We examined our hypothesis by a research of 41 young couples from Slovakia. During three menstrual cycles female participants filled in a diary of 30 questions. Through use of the female daily reports we were able to collect information about the behaviour of their primary partner and about the couples' course of the day. We have found a significant change in intensity of several mate guarding tactics across the menstrual cycle with a prominence in the most fertile period of the cycle, e.g. male partners wanted more to spend the time with the female partner and the communication of couples was more harmonious.

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ALERTNESS AS A RELIABLE AND PRACTICAL MARKER OF QUALITY OF NEWBORN BABIES

While it is crucial for newborn babies to send signals of high biological quality to assure parental investment, a neonate sleeps over 20 hours per day and being asleep means less interactions with the parents. We hypothesized that being alert by keeping eyes open 1) advertises high quality of the neonate, and 2) is noticed and preferred by the adults. Among the photographs of newborn babies published in a local Polish newspaper all babies photographed with their eyes open (i.e. alert) plus a random sample of babies photographed with their eyes closed (564 boys and 583 girls, body mass 2500 -5000 g) were recorded. Boys with open eyes were heavier by 118 g (3.2%) than boys with closed eyes, i. e. alertness was a good indicator of higher body mass. In girls, possibly because after birth they are more mature than boys, alertness no longer serves as a marker of quality. Adults (n=153), who were not aware of the purpose of the test, were shown sets of 20 randomly arranged photos of 10 babies with eyes open and 10 babies with eyes closed. Each baby received a score indicating unintentional preference. Adults preferred babies with open eyes, with young males showing the lowest preference and village women showing the highest preference towards children in general. "Open eyes" is therefore a reliable marker providing information about high biological quality (but only of male babies), and a practical marker, since adults use it as a basis of their preference.

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THE ROLE OF SELF-AWARENESS IN DECEPTION

Self-awareness, defined as the ability to reflect on one's own thoughts, allows for the development of Theory of Mind (ToM). ToM can be conceptualized as the ability to "mind read" or decipher what another person is thinking based on one's own thoughts. Since intentional deception requires one to understand the mental state of another (hence, TOM), we predicted a positive linear relationship between self-awareness and deception ability. Thus, we hypothesized that having knowledge of one's own thoughts should translate to a greater ability to deceive (i.e., having knowledge of another person's thoughts). We asked twelve novice actors to portray varying levels of deception, such that actors conveyed "truth" (accurate biographical information), "faking good" (deception via exaggeration of desired characteristics) and "faking bad" (deception via exaggeration of negative characteristics). All of the presentations were based on a script, modified for accuracy, and then randomly shown to participants. Forty-two undergraduates viewed the portrayals and rated the actors' believability for each condition. Participants detected the actors' deception at a level on par with chance, with actors successfully deceiving participants in 45% of the trials. Furthermore, we found that actors with high private self-awareness were more effective deceivers. Individuals who are high in private self-awareness tend to be conscious of their feelings, thoughts, attitudes, motives and behavioral tendencies. Being aware of one's own thoughts may be beneficial in that these can be used to enter the mind of another person and ultimately deceive them.

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TESTOSTERONE AND DOMAIN-SPECIFIC SELF-ESTEEM

Psychologists have long studied the importance of status within social hierarchies, yet past research has not developed a clear definition of status in humans. Often status is described only in terms of dominance, with dominance normally being thought of as a method of achieving status through violence, aggression, and intimidation. However, Henrich and Gil-White (2001) argue that human status is composed of two alternative forms or methods of attaining status: dominance and prestige. They contend that while dominance reflects the attainment of status via the use of force or threat of force, prestige is conferred freely by others. Factor analysis has shown that prestige, dominance, and status can be measured as separate and independent constructs and correlate differentially with other theoretically relevant variables. This study examines the theory that testosterone levels will correlate differentially with global and domain-specific measures of self-esteem. Forty-three men provided saliva samples, from which testosterone levels were obtained through immunoassay, and completed questionnaire measures of dominance, prestige, status, and other measures of domain-specific self-esteem. We hypothesize that testosterone levels will be more highly correlated with self-reported dominance than with global self-esteem or other domain-specific measures of self-esteem. Data has been collected and is currently being analyzed.

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WHAT DOES THE "POLYGYNY-THRESHOLD MODEL" PREDICT?

The "Polygyny-Threshold" model (PTM) is robust, useful, contentious, and over-applied. The model describes how females might opt for polygyny if the cost they incur by doing so is compensated by some benefit. This would seem to imply that women who choose polygyny should have fitness similar to monogamous women, although there is disagreement over this. Simulations show that the PTM does indeed yield this result under a variety of circumstances. Results from 19th century Utah Mormons match the simulations to a surprising degree. The PTM is unexpectedly robust, but it is not appropriate for all polygynous groups nor all polygynous women.

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SELF-MANIPULATIONS OF WAIST-TO-HIP RATIO USING A NOVEL DIGITAL PARADIGM

Evolutionary psychology places an emphasis on reproduction and fitness. Previous research has indicated that a waist-to-hip (WHR) ratio of .7 is considered most attractive for females. Here we demonstrate the use of Goo-based software to manipulate body ratios. We first digitized the images of 23 undergraduate female participants. Both self and other bodies were manipulated by participants using Kai PowerTools software. It was found that there was a significant reduction of WHR across three views (front, side, back). Further, participants with WHRs greater than .7 reduced their ratio, while those participants below .7 increased their WHRs. Weight and height were not significant correlates of WHR manipulation. Original WHR, however, was a significant predictor. These data support previous findings

that .7 is an idealized WHR. Further, the methods employed in the current study advance the ecological validity of WHR studies by allowing the participants to manipulate their own ratios.

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TESTING THE SEXUAL SELECTION HYPOTHESIS OF HUMAN CREATIVITY

Whilst the sexual selection model is often used to explain the emergence of creativity empirical work to test this hypothesis is in its early stages. However, before examining this theory it is necessary to develop a working definition of creativity.

Since sexual selection is applicable to everyone it was felt necessary to develop a definition of creativity that reflected the views of the general population. Thus a questionnaire was developed and a scale to place people on a continuum of self-rated creative behaviour was also constructed.

The analysis demonstrated that the creativity continuum was a unidimensional scale with a normal distribution. From the results a definition of creativity was constructed that reflected the implicit understandings of a general population which included the assumption made by the participants that creative products primarily equated to those of The Arts.

Further results showed that one of the most important aspects that make a product creative was that it communicates ideas and/or emotions. This result will lead to a future project to test whether creative products are acting as extensions of the mind by expressing the ideas of the makers of creative products and/or whether products are acting as fitness indicators as predicted by sexual selection theory. This project will, in part, involve placing those who make the products on the self-rated creative behaviour continuum and this rating will be compared to how attractive they are believed to be from a consideration of their creative products.

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THE RELATIONSHIP BETWEEN DIGIT RATIO AND PROSODIC FEATURES OF CHILD-DIRECTED SPEECH IN MEN: DOES PRENATAL EXPOSURE TO TESTOSTERONE INFLUENCE LATER CHILD-DIRECTED COMMUNICATION?

We investigated relationships between prenatal testosterone exposure (assessed by digit ratio), attitude towards children, and phonetic features of child-directed speech. Eighty-nine men (18-24 years old) rated their attitudes towards children after giving simple route descriptions directed to imaginary adults (AD) and imaginary two-year old children (CD). Descriptions started with the same lead-in sentence, providing invariant speech samples for acoustical analyses. Digit ratio was positively correlated with the CD-AD difference in pitch at various points in the lead-in sentence. Positive attitudes toward children were not correlated with digit ratio or pitch change, but were positively correlated with CD-AD changes in 1st (F1) and 2nd (F2) formants of the vowel /i:/. These formant changes were mainly due to an increase in F2, which is linked to the hyperarticulation of front vowels in CD speech (Kuhl et al., 1997; Burnham et al., 2003). Pitch changes in speech have been linked to affect expression, whereas hyperarticulation may improve the intelligibility and learnability of language (Burnham et al., 2002). Our findings suggest that vocal correlates of affect expression in CD speech are influenced by pre-natal exposure to testosterone: men with relatively 'feminine' 2:4 digit ratios show more pitch change than men with 'masculine' ratios. Realization of linguistic units such as phonemes, which may be under more deliberate control, is related to attitude towards children but not digit ratio. Our findings add to the literature that testosterone may

have both organizational and activational effects on aspects of paternal investment (e.g. Gray et al., 2002).

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'COSMIST EVOLUTIONARY FUNCTIONALISM' - FOR THE UNIVERSAL COMPREHENSION OF A HUMAN BEHAVIOUR

My point of departure is the assertion of the so-called 'Anthropological Evolutionary Paradox': Man is an uterine element of the one common whole cosmic evolutionary process of the life on Earth (Process, in my abbreviation); however we exclude the search for universal evolutionary knowledge and refer to the plural (different and often incompatible) sources of knowledge in defining man's nature - biological, sociological, psychological, etc. Cosmist evolutionary functionalism aspires to reach universal knowledge relying on its own philosophic system of original cosmological, ontological, epistemological, and anthropological fundamentals. Their essence and the characteristics of the original Cosmist theoretical proposals (notions and principles) of Universal Functional Reductionism, Basic Cosmist Functionality of a human being, CosmoBiotypology, and other can be grasped in the paper "Bringing Forward the Philosophy of Universal Science" (E-LOGOS, <http://nb.vse.cz/kfil/elogos/science/khrou1-03.pdf>). The three guiding principles of the whole Cosmist edifice are: 1. Principle of the Universal Functional Integration - 'all living is a whole - an integrated functional subject'; 2. Principle of the Universal Emergent Evolutionism - 'all living - any subject - is an evolutionary process'. This principle has equally both the micro-evolutionary (adaptational) essence, and the macro-evolutionary essence (of inherent, cosmist creative activity); 3. Principle of the Evolutionary Selection from Above - 'evolutionary selection from the emergent future'. In Cosmist light, man equally is as the bio-organism, social actor, and unique person (in adaptation to the environment), as the COSMIST agent of executing his or her ultimate functional (personal) – cosmist – contribution to the welfare of Process.

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SELF-PRESENTATION STRATEGIES AS SIGNALS OF PRO-SOCIAL INTENT IN SOCIAL RELATIONSHIPS

In a study on self-presentation in everyday social encounters, 154 undergraduate students described their social interactions for two weeks using a variant of the Rochester Interaction Record. For each interaction, participants described their self-presentation motives and perceived success in creating desired impressions. The self-presentations for which motivation and perceived success were measured were physical attractiveness, commitment, concern, helpfulness, assertiveness, and desire to avoid conflict. Participants also indicated their relationship with the interactant, choosing between roommate, acquaintance, friend, friend with romantic potential, romantic partner, and other. A series of multilevel random coefficient modeling analyses found that self-presentation motivation and perceived success were higher in relationships that seem, prima facie, more important to participants. Sex differences in self-presentation motivation and perceived success occurred in multiple combinations of self-presentation type and relationship type. In such cases females consistently had a higher self-presentation motivation and perceived success. These findings suggest differences in investment in different types of relationships, with individuals trying harder and being more successful at signaling their pro-social intent

to those with whom they have a greater stake in the shared relationship. Implications for pro-social signaling, social exchange, and deep engagement will be discussed.

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RISK-TAKING PROPENSITY AND PROPOSER BEHAVIOR IN THE ULTIMATUM GAME

In the one-shot Ultimatum game (UG), proposers run the risk of having offers rejected (a costly outcome) when they offer amounts below the responders' preference thresholds, which apparently reflect local "fairness" norms (approximately 50% of the total divisible sum in North American samples). Nevertheless, some proposers typically take such risks. We investigated whether risk-taking propensity, as measured by the Risk-behavior Scale (RBS; Weber, Blais, & Betz, 2002), and endogenous levels of testosterone (a predictor of competitive risk-taking) are related to amounts offered by proposers in the UG. As predicted, several RBS subscale scores were significantly correlated with amounts offered by proposers (Spearman rank correlation coefficients ranging between $-.313$ and $-.554$ for the complete sample and the male subsample, $p < .05$), but no other relationships among amounts offered or RBS scores and testosterone levels achieved significance. Despite considerable and pervasive variation within human populations, there has been little systematic analysis of reliable individual differences in behavioral phenotypes from an evolutionary psychological perspective. As behavioral differences have important implications for selection, we propose that examination of individual differences may inform the study of human evolutionary psychology.

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THE CONSILIENCE OF RELIGION AND SCIENCE: AN EVOLUTIONARY PERSPECTIVE, PART 2

Mescher & Kurland suggest that consilience between religion and science requires science to recognize evolved human spiritual needs and religion to acknowledge the epistemological primacy of science. Although some seek reconciliation by looking to modern physics to validate particular religious concepts, we believe that such efforts merely elevate superstition to a higher level. The relevant field for exploring the relationship between science and religion is not quantum mechanics but rather evolutionary biology. From this perspective, the treasure of the world's religious traditions lies not in their metaphysics but in their collected wisdom regarding the human condition and human social relations. We claim that Buddhism represents a particularly promising example of the potential compatibility between science and religion. Despite sectarian differences and superstitious variants, Buddhism is essentially atheistic, empirical, experiential; it embodies a deep skepticism that undermines dogmatism. For example, Buddhist psychology entails a massive mental modularity that is remarkably similar to contemporary embodied cognitive neuroscience; there is no permanent, abiding self. Buddhist epistemology underscores the limitations of language and cognition and in turn emphasizes the delusions and self-deception that govern the human condition. Other Buddhist doctrines seem to reflect the realities of reproductive competition and relative fitness. Biologists from T. H. Huxley to G. C. Williams have long noted compatibility between Buddhism and evolutionary science. Recent advances in the study of human cognition and cultural evolution make it possible to explore this compatibility more fully.

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DOES MOTHER'S PERSONALITY INFLUENCE THE HUMAN SECONDARY SEX RATIO?

It is assumed that various factors affect secondary sex ratio. Mother's personality traits are mentioned among them. According to the maternal dominance hypothesis - influential, prevailing and high in control (i.e. with dominant personality) women conceive sons more frequently which is supposed to result from higher level of testosterone in those women. This assumption gains support from the studies by Grant (1992, 1998, 2001), who used the Simple Adjective Test (SAT) - a psychological test designed to measure dominance based on selected adjectives.

To test this hypothesis the Polish version of SAT was used to examine 760 women staying after their first delivery at maternity wards. Preliminary results indicate that there are no statistically significant differences in number of picked adjectives indicating dominance level between mothers bearing children of both sexes (Mann-Whitney U, $p=0,65$). The result suggests that mother's personality does not exert the sex of the infant. Further investigation will involve an attempt to check whether maternal factors (socio-economic, biological and psychological) analysed together influence the secondary sex ratio.

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SEX DIFFERENCES IN THE PREDICTION OF GLOBAL SELF-ESTEEM FROM DOMAIN-SPECIFIC SELF-ESTEEMS

Previous research examining gender differences in both global and domain-specific self-esteem have yielded mixed results, in large part due to inconsistencies and theoretical weaknesses in traditional conceptualizations of self-esteem and its specific components or dimensions. Kirkpatrick and Ellis (2001) have presented an evolutionary-psychological theory of self-esteem as comprising numerous psychological mechanisms that are functionally domain-specific, including self-evaluative mechanisms designed to solve adaptive problems in both competitive (e.g. mate value, status) and cooperative (e.g. social inclusion) social domains. Based on this perspective, we hypothesized that because men and women faced consistently different adaptive problems over evolutionary history, functionally specific domains of self-esteem should be of differential importance to men and women and thus be differentially predictive of individual differences in global self-esteem. In this research we analyze data sets from several unpublished studies that included measures of both global self-esteem and various specific measures of self-esteem reflecting the functional domains outlined by Kirkpatrick and Ellis. It is expected that these domains will differentially predict global self-esteem for men and women: Specifically, competitive domains of self-esteem should better predict global self-esteem in men, while cooperative domains of self-esteem should serve as better predictors of global self-esteem in women. [Data analysis is in progress at the time of this writing.]

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A MATHEMATICAL OPERATION OF THE TRIUNE BRAIN MODEL

Introduction: The model refers to the 'Limbic System' as advanced by Paul McLean (1973).

Model: Major variables and functions are:

- 1) The output of the Temporal lobes is termed ENGRAM
- 2) The Power of Concentration in the Frontal cortex is termed CONC
- 3) SYM refers to the cortical arousal effect in the Hippocampus of non-recognised stimulus
- 4) PARASYM refers to the cortical facilitation via thalamo-cortico projection pathways of stimulus recognised by Hippocampus
- 5) The output of the Limbic System as perceived by Gyrus Singularis is an autonomic balance (ANS) with Sympaticus (SYM) as the independent and Parasympaticus (PARASYM) as the dependent variable given by the equation:
(1) $PARASYM=K-SYM(X)$
- 6) The basic law of reinforcing learning is explained by the equation:
(2) $ENGRAM_{t_1}=ENGRAM_{t_0} \times PARASYM \times CONC$

Result:

- 7) Substituting (1) in (2) gives $ENGRAM_{Max}$ for $CONC_{Max}$ and SYM_{Min} . This implies that *in-depth-relaxation is as important to learning as cognitive processes*.

Discussion of evidence: Freudian psychotherapy is explained as a state of relaxation deliberating suppressed thoughts reinforcing learning potentials.

A series of randomised controlled trials on transcendental meditation (TM) demonstrate efficiency with respect to in-depth-relaxation and related health benefits as

- reduced blood pressure
- independence of physical stimulants
- increased capacity of association

Trials on other meditation, Yoga, autogenic training and physical exercise demonstrate analogue results.

Conclusion: Exercises of relaxation are evidenced both to stabilise Parasympaticus and deliberate learning potentials. Preventive use of in-depth-relaxation is recommended as a precaution towards sustainable development.

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THE ADAPTIVENESS OF HUMAN FACE PREFERENCE

Mate-choice and partner preference has received much attention from evolutionary psychologists. Such research has attempted to explain why some cues are attractive to different individuals and to individuals from different cultures. In faces, these traits include symmetry, sexual dimorphism, averageness, and health. The extent to which preferences for particular traits results in direct or indirect benefits, however, remains controversial. To investigate this issue, studies have examined correlations between traits and factors linked to benefits for the choosing individual, such as facial symmetry and actual health. One problem with this approach in 'modern' societies is that the signal may have become uncoupled from the possible benefits to the chooser. For example, relationships between actual health and measured symmetry may be masked because of recent cultural or societal changes in patterns of nutrition and access to modern medical treatments. While actual (i.e. real life) partner choices may be constrained, preferences (i.e. what individuals ideally want in a partner) may reflect evolved mechanisms from our evolutionary history. Here we review studies that have emphasised the roles played by own condition, reproductive status, context and current life-history status. These findings 1) demonstrate the sophistication of partner preferences, 2) support the hypothesis that facial preferences act in ways that provide benefits to the chooser and 3) are indirect evidence for evolved adaptations in mate choice.

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FLUCTUATING ASYMMETRY AND SECOND-TO-FOURTH DIGIT RATIO RELATED TO GENERAL INTELLIGENCE AND PERSONALITY

Fluctuating Asymmetry, non-pathological variation in the size of bodily features, is an index of developmental stability. 2D:4D ratio, i.e. index finger length divided by ring finger length, is an index of prenatal testosterone exposure. We related these two indices of development processes to General Intelligence and the Big Five personality dimensions in a Dutch population sample that was restricted only by age: they were between 17 and 24 years old. We found a relation between Fluctuating Asymmetry and General Intelligence (r between $-.30$ and $-.50$) and marginal significant relation of Fluctuating Asymmetry with Openness, but only in women. We also found a relation between right hand 2D:4D and Agreeableness (r between $.30$ and $.50$). We conclude that development, cognition and individual differences are more related than usually is assumed, and that this line of research may contribute to the development of an interactionist (nature and nurture) agenda.

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THE ROLE OF ALTRUISM AND PUNISHMENT IN THE EVOLUTION OF COOPERATION

Recently, several researchers have proposed that humans have evolved so-called strong reciprocity, the propensity to reward altruism by co-operating, and punish individuals who defect (Boyd et al, 2003, Gintis et al, 2003, Fehr and Gächter, 2002). Fehr and Gächter (2002) showed that in experimental situation, cooperation flourished when participants were given a chance to punish those who did not cooperate. This propensity to punish defectors seems to be a prevalent feature across different cultures (Henrich et al, 2001), and it is possible that punishment has co-evolved with altruistic tendencies and has the function of maintaining reciprocal altruism.

In this study, a questionnaire was devised in order to find out whether altruistic tendencies are correlated with punitive tendencies. 250 subjects were given the self-reported altruism questionnaire (Rushton et al 1981) and a questionnaire measuring past punitive behaviour. A moderate correlation was discovered between altruism and punishment. It is suggested that altruism and punishment might be part of a same personality dimension, and that individuals in a population fall within a normal distribution curve in both of the traits. More studies are suggested in order to discover whether strong altruists behave in a more punitive manner than less altruistic people.

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TESTING THE SPFIT MODEL OF ADDICTIVE BEHAVIOR: DEVELOPMENT OF THE SELF-PERCEIVED FITNESS QUESTIONNAIRE (SPFQ)

Several theories conceptualize addictive behavior from an evolutionary perspective—for example, the Self-Perceived Fitness (SPFit) theory (Newlin, 2002, *Addiction*, 97: 427-446.). According to SPFit theory, addiction is understood as the organism's pursuit of stimuli (i.e., substance use) that increase (Nesse & Berridge, 1997) the self-perception of large fitness increases (i.e., cortico-mesolimbic dopamine system activation), despite the fact that these pursuits may decrease the organism's fitness. Drugs of abuse

artificially inflate SPFit, producing exaggerated feelings of power, influence, and personal and sexual attractiveness (i.e., self-perceived fitness) while intoxicated; these feelings correspond to survival and reproductive fitness, respectively.

SPFit is a scientific theory insofar as it makes empirical predictions and is falsifiable, but SPFit remains unmeasurable and therefore untestable. Toward validating the SPFit theory of addictive behavior, we developed a paper-based measure of SPFit, termed the Self-Perceived Fitness Questionnaire (SPFQ).

Following Newlin's (2002) description of SPFit, 112 items were generated in two superordinate categories and ten subdomains. The initial SPFQ was administered to 330 undergraduates at Binghamton University. Following standard data screening and identification of gender differences, principal components analyses using oblique rotation were conducted by gender, yielding similar three factor solutions. The first factor was interpreted as Self-Perceived Dominance/Control/Power (accounting for ~37% of the variance), the second as Perceived Social Influence and the third as Perceived Interpersonal Attractiveness, each accounting for 37%, 7%, and 6% of the variance, respectively. Multidimensional scaling mapped items onto quadrants corresponding to: attractiveness/socio-sexual dominance; confidence/success; healthy/robustness; and role model/fecundity. This research is ongoing.

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TOWARDS AN EVOLUTIONARY PERSPECTIVE ON SELF-EFFICACY

On this poster I present some integrating ideas aiming at the development of an evolutionary perspective on self-efficacy.

The approach centers on the argument that attaining and preserving social inclusion, social status, and individual social value as mate, partner for reciprocal exchange, and ally in instrumental coalitions had been crucial to reproduction and survival in ancestral environments.

Corresponding domain-specific adaptations are described and analyzed in terms of their capability to produce adaptive behavioral and cognitive output in complex social ancestral environments. Further analyses focus on examining whether the generation and operation of self-efficacy expectations reflect the functions and functioning of these adaptations. Thereby the adaptations are hypothesized to process evolutionary stable and recurrent cues indicative of individual levels of social inclusion, status, and value in various social relationship domains.

Cues are e.g. indicators of resource-holding potential and social attention-holding potential. Thus for instance theoretical links between self-efficacy on the one hand and competitive success and social inclusion on the other hand are provided.

Drawing further on findings generated by self-efficacy theory, I propose a set of specific testable hypotheses on these adaptations and self-efficacy and experimental designs to test these hypotheses.

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FAST AND FRUGAL HEURISTICS: IMPLICATIONS FOR THE MODULARITY VS. MASSIVE MODULARITY DEBATE

The Modularity Thesis (MT; Fodor, 1983) states the mind is made up of a few modular systems plus a domain-general, unencapsulated central system that serves higher-order functions, like decision-making. The Massive Modularity Thesis (MMT; Tooby & Cosmides, 1992) is the idea that the mind is like a Swiss Army knife, a collection of specialized tools designed to solve adaptive problems. MMT contrasts with MT by claiming central capacities can also be divided into domain-specific modules.

Both face challenges. MT faces the criticism that an unencapsulated central system is prone to computational intractability problems. MMT has been criticized for being based on the unwarranted premise that domain-specific mechanisms outperform domain general ones in principle, and for not accounting for the holistic nature of human thinking (Fodor, 2000).

The idea that individuals have limited resources, such as time and cognitive capacity, has lead some to propose people make decisions by relying on fast and frugal but accurate heuristics (FFH; Gigerenzer, Todd, & The ABC Research Group, 1999).

I argue that computational tractability and domain-specificity are main issues that MT and MMT can agree upon, although at the expense of encapsulation. Additionally, I propose that MT and MMT can be combined by assuming that the central system uses FFH to make decisions. I try to show that FFH are domain-specific alternatives to encapsulated modules for decision-making, thus supporting MMT. Finally, however, I argue that we still need MT's central system concept to select decision cues and choose between heuristics.

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PREFERRED NUMBER OF SEXUAL PARTNERS: TAILS OF DISTRIBUTIONS AND TALES OF MATING SYSTEMS

Based their own data, and on a reanalysis of Buss and Schmitt's (1993) data, Pedersen, et al. (2002) concluded that most men and women prefer to have only one sexual partner over their lifetimes. Buss and Schmitt used the t-test, which is inappropriate because the data are highly skewed. Pedersen, et al. therefore used the median test, but that test lacks power. Here we reanalyze both sets of data using graphical and statistical methods that consider the entire distribution. First we show that cumulative percentages, and the appropriate Kolmogorov-Smirnov statistical test, clearly reveal that men prefer more sexual partners than women do. Second we plot the cumulative percentiles of preferred number of partners for men against women; the result is a straight line with a slope of approximately three, indicating that men prefer approximately three times as many partners as women do. Third we demonstrate that the shape of the function between approximately 1 and 6 preferred partners is consistent with a normal distribution for both men and women, but with different means and standard deviations. Thus those who prefer more than one partner cannot properly be considered to come from a different population from those who desire only one partner. Finally we discuss the implications of such data for sexual strategies theory (Buss & Schmitt, 1993) and attachment fertility theory (Miller & Fishkin, 1997).

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TALLNESS COMES WITH HIGHER MORTALITY IN TWO COHORTS OF US ARMY OFFICERS

In all societies studied so far, taller people have a lower general morbidity and mortality, the only notable exception being cancer. The underlying causality is complex, because all relevant factors -- genetics, nutritional status in childhood, upward social mobility for tall people, fewer health hazards, better medical care for high status people, together with cohort effects -- are highly intercorrelated. Here we study two special samples: graduates of the classes of 1925 and 1950 from the U.S. Military Academy at West Point, retired without disability after 20 or more years in active service. As young adults these men were rigorously selected for health and physical fitness, afterward subjected to a healthy lifestyle, and medically well cared for. Consequently, in these samples the variability of most intervening variables is

low. We show with nonparametric, semiparametric, and parametric survival analyses that the taller half of both samples had an excess mortality between ages 60-75.

Elsewhere we have shown, for the Class of 1950 sample, that tallness comes with increased reproductive success: taller men had more children⁴⁶. Higher post-reproductive mortality for tall men, reported here, may be the first trace of an evolutionary constraint on tallness, at least in males, as predicted by evolutionary theory.

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NEUROENDOCRINE CORRELATE OF "SOCIAL BRAIN"- MEDIATED COGNITION AND EMOTION IN HUMANS

Dunber's "social brain hypothesis" proposes that several areas of human brains have evolved to deal with social problem-solving tasks such as mind-reading of other conspecifics. Recent progress in neuroscience has revealed that "Theory of Mind" and empathy are mediated in the limbic-neocortical brain regions (e.g. ventromedial prefrontal cortex, insula, and amygdala). Damasio's "somatic marker hypothesis" also indicates these brain regions play pivotal roles in social judgment (e.g. judgment of trustworthiness of other people) and economic decisions (e.g. risk-aversion in a gambling task), by forming the brain's body-state representation (e.g. perception of autonomic response to social signals). Additionally, LeDoux's "emotional brain theory" states that these "social brain" regions (i) have evolved to evoke an autonomic response to ecological threats (i.e. anxious vigilance), and (ii) are associated with stress systems (originally evolved in relation to territoriality). In our studies, we have examined the relationship between subjective autonomic reactivity (known to correlate with empathy), anxiety, and cortisol (a stress hormone) level in humans. We also look at the relationship between emotion (e.g. anxiety, depression) and cognitive functions (e.g. prospective and social memory) which Dunber's hypothesis proposes have evolved to deal with social problem-solving tasks. We discuss the results of these studies, and their possible implications for how social cognition and emotion have co-evolved at the neural substrate level.

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THE EFFECTS OF GENDER ATYPICAL BEHAVIOR ON PERCEIVED ATTRACTIVENESS IN HETEROSEXUAL AND HOMOSEXUAL POPULATIONS

Researchers have shown that both heterosexual and homosexual men and women tend to evaluate gender atypical behavior (i.e., behavior that does not conform to stereotypical norms of male and female behavior) less favorably than gender typical behavior when assessing the perceived attractiveness of target individuals (Bailey et al., 1997; Laner, 1978; Laner & Kamel, 1977; Nida & Williams, 1977). Additionally, recent research by Bailey et al. (1997) indicates that perceived attractiveness ratings of gender atypical behavior may be lowest among homosexual men. The present study aims to compare the effects of gender atypicality on perceived attractiveness in men and women, both heterosexual and homosexual. Subjects evaluated the attractiveness of various targets after viewing short video presentations of the targets acting in a stereotypically masculine, feminine or neutral manner. A mixed analysis of variance revealed results that contradict many of the previous findings on the effects of gender atypicality. Homosexual men and women tended to rate the target individuals more favorably in all conditions (masculine, feminine and neutral) than the heterosexual men and women. An interaction trend between the gender atypicality of the target video and the gender of the rater reveals that both heterosexual and homosexual women tended to rate femininity less favorably than the other conditions. It

therefore appears that heterosexual women are more critical of gender atypicality in perceived attractiveness, but homosexual women tend to prefer more masculine or androgynous (i.e., both masculine and feminine) behaviors. Homosexual and heterosexual men did not distinguish between conditions in their ratings.

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EVOLUTIONARY ORGANIZATIONAL PSYCHOLOGY (EOP): A NEW APPROACH TO ORGANIZATIONAL BEHAVIOR AND WORK HEALTH PSYCHOLOGY

One of the main pillars of evolutionary psychology is that the design of psychological mechanisms are outcomes of thousands of years of social and environmental pressures and that these are suited the past and sometimes at discord with present circumstances. Decades of research into organizational psychology (OP) have been theoretically guided by behaviorist and humanistic models that have been ignorant or directly hostile to evolutionary approaches to human behavior. One of the founders of modern OP stated that: "...the major explanation for the variation we see in human behavior is that such behavior is only partially determined by whatever motives we bring with us as members of a biological species." (Schein, 1980, p.40). Accordingly, common workplace problems like ill-health absenteeism, job strain, turnover, sub-optimal work performance etc., have been understood by way of stress theory, demand/control model or effort-reward imbalance theory. Standard OP has ignored the fact that psychological mechanisms have evolved during stable temporal environments and that our species have predominantly lived in hunter-gatherer societies. Urban life and formal organization of work is a very recent social innovation based upon principles of modern warfare and industrial production. A recognition of the discrepancy between ancestral environments and demands of modern organizations, forces OP to make several predictions about mismatches that are counterproductive to human well-being and organizational goals. Based on research and theories within OP and EP, we recommend OP to incorporate concepts from evolutionary models to make predictions about organizational behavior and suggest work life interventions to promote productivity and employee health.

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LIKE FATHER, LIKE SON? EFFECT OF BELIEF IN GENETIC RELATEDNESS ON RESEMBLANCE RATING

Facial resemblance between parents and their children could be an indicator of genetic relationship. A putative father can confirm his paternity by assessment of the facial resemblance to himself and his blood relatives. If a child is likely to resemble to father, he/she could extract the biological father's investment. However, biological father and foster father are not the same in many cases and biased resemblance to father could cause child abuse or infanticide in such a case. It is important to study recognition of parent-offspring resemblance and existence of practical bias of resemblance. However, peoples detect family resemblances based on the knowledge of the actual genetic link between individuals. So, belief in genetic relatedness could affect their detection. True genetic relatedness and belief in genetic relatedness should be separated. Bressan & Dal Martello (2002) asked Italians to detect family resemblance of Italians by their pictures. In their study child-adult pairs were estimated being given either truthful or deceitful information about their relatedness. They indicated that belief in genetic relatedness affected the subjects' detection. Some other effects of the picture's and subject's sex were also evaluated. We replicated this

study by using Japanese families and subjects. We found the same effect of belief in genetic relatedness but at some other points our results were different from which in Italy. Addition to the analyses in previous study, we newly collected and analyzed response latencies of each subjects to evaluate effects of information on the detection.

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THE RELATION OF 2D:4D AND MALE EXTERNAL GENITAL MEASUREMENTS

The ratio of the second to the fourth finger (2D:4D) shows sexual dimorphism, has been suggested to be a marker variable (i.e., a retrospective window) into fetal hormonal conditions, and has been demonstrated to be related to a wealth of sex-dependent traits, including fertility-related measures (Manning, 2002). Morphologic patterns of the fingers may also be related to morphologic patterns of the external genitalia. This is conceivable on the following grounds: across vertebrate species (including humans), the Homeobox (Hox) genes regulate limb development and particularly morphogenetic endpoints such as fingers and toes, but also urinogenital system development, including the penis (Kondo et al., 1997). There is evidence for positive relations of penile shaft length and volume, glanular length, and total penile length with index finger length, i.e., 2D (Spyropoulos et al., 2002). Voracek & Manning (2003) conjectured that ring finger length (4D) may be even more strongly positively related than 2D to penile measures and, as a consequence, that 2D:4D may therefore be negatively related to penile measures. We tested this hypothesis in a pilot study with healthy Austrian males. 2D:4D measurements were obtained from photocopies of the hand, while penile length and circumference measurements, for both the flaccid-stretched and the erected state, were secured by tape measurements, and penile shaft volume estimates were calculated from those variables. Interim results from this ongoing study are supportive for a negative relation of 2D:4D and penile measures, which survived statistical control for subjects' height and age.

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DO JAPANESE 4-YEAR-OLDS UNDERSTAND OTHERS' FALSE BELIEF?

It is often said that children begin to understand others' knowledge state around 4 years of age. Many studies have shown that 4-year-old children succeed false belief tasks while children under that age tend to fail. Although it is believed that developmental trajectory of theory-of-mind is universal, Wellman et al.'s (2001) meta-analysis showed that Japanese children's false belief understanding tend to develop more slowly than children in other countries. Fifty seven Japanese children (3- to 6-year-olds) were tested with a typical false belief task (i.e., Sally-Ann task). The result showed that a majority of Japanese 4-year-olds did not succeed on the task (success rate = .31). Even 5-year-olds showed relatively low success rate (0.58). I also conducted a literature review on Japanese children's false belief understanding. There are in fact some studies reporting high success rate for 4-year-olds (e.g., Kinoshita, 1991). One possible factor mediating the Japanese 4-year-olds' performance is a style of questioning. Japanese children's success rate tends to be higher when directly asked the knowledge state (i.e., think-question), whereas their success rate tends to be lower when asked the protagonist's future behavior (i.e., look-for-question). A multiple regression analysis with age and question type as independent variables and success rate as a dependent variable revealed significant effects of age ($t(23)=8.88, p < .01$) and question type ($t(23)=2.18,$

$p < .05$). This result suggests that Japanese children understand others' false belief but are not good at predicting others' behaviors based on the understanding.

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THE ROLE OF INSTINCTS IN MODERN SOCIETY

This essay gives a personal view of the meaning of instincts in the life of modern man and the meaning of "panem et circences" in western society. It deals with the "decompression valves" of society as they have grown over the last centuries in order to deal with the basic instincts of both men and women as they increasingly had to live in (over)regulated societies. Modern society has moved away from our ancient environment and this causes some problems in day to day life for a lot of people. Over time society has developed ways to manage the tensions arising from living in an "artificial" environment. Regrettably a lot of effort has gone into philosophical and religious frameworks which at best ignore or at worst condemn part of our basic instincts and needs, often with great harm to human lives and lots of grief on those who handed over the basis of their existence to other who knew "better". Our instincts have evolved over the ages to guide us through life and to provide the necessary basis needed for our survival. Instincts, in all species, deal with life and death, survival of individuals and each species. They regulate and guide the competition in and between species, mating behaviour and the care for offspring. One could summarize the workings of instincts as outward competition and inward care, where the "scale" of in and out may differ. This text is meant to provoke some thought, not to offend or insult anyone.

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I CAN'T BELIEVE IT! - HOW EMOTIONS CAN BE USED STRATEGICALLY

In communication, the strategic use of emotions is particularly important when the credibility of the transmitted information is under question. We used videotapes with true and false stories presented by different narrators to examine the influence of positive and negative emotions of different intenseness on the judgment of credibility. These videotapes were presented to German native speakers as well as subjects incapable of understanding German language under different conditions, e.g. only visual or only acoustical information given. Credibility of the stories, nature and intenseness of emotion shown by the narrators and nature and intenseness of emotion induced in the subjects were measured by ratings given separately for each story. Additionally in one experiment psychophysiological measures were taken from the subjects while listening to the stories. Variables which are able to moderate an influence of emotion on credibility were measured and taken into account during data analysis.

Taken together, the results present replicated evidence that the intenseness of emotions perceived by subjects is substantially correlated with their judgment on credibility. Thus, a strategy that uses emotion as a tool to influence the assessment of credibility would be a successful one. To our surprise, there was no conclusive evidence that the narrators made use of this strategy. We believe that this is due to the fact that under the conditions of our experimental study for the narrators no substantial gains or losses are associated with the assessment of their credibility.

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ACCURACY IN PERSONALITY ATTRIBUTIONS MADE ON THE BASIS OF FACIAL CHARACTERISTICS

Faces convey a vast amount of information of importance to social primates such as humans. In addition to signalling identity, sex, age and emotional state people frequently use facial characteristics as a basis for personality attributions. Typically, there is a high degree of consensus in the attributions made to faces – people agree on the personality they expect a person to have on the basis of their facial characteristics. Nevertheless, the extent to which such judgements are veridical is unclear and somewhat controversial. We have examined the relationship between self-report and perceived personality using a number of techniques and have found some evidence to suggest that, for some of the “Big Five” personality dimensions at least, it may be possible to “judge a book by its cover”. 150 men and 150 women were photographed and completed self-report personality questionnaires from which scores on the dimensions of agreeableness, conscientiousness, extraversion, neuroticism and openness were derived. Computer graphics techniques were used to generate composite faces from individuals scoring high and low on each dimension and these were then rated for personality and attractiveness by independent participants. Composites generated from individuals who scored high or low on each self-report dimension were generally rated accordingly but these findings could be due to “halo effects”. Binary logistic regressions, however, indicated that, controlling for attractiveness, independent ratings on congruent personality dimensions were best able to discriminate between composite faces generated from individuals high or low on the self-report dimensions of agreeableness, extraversion and neuroticism.

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THE EFFECTS OF MALE SOCIOSEXUALITY ON ASSOCIATIONS OF FEMALE FA AND WHR WITH ATTRACTIVENESS RATINGS

The relationship between male sociosexuality and assessments of two evolutionarily-relevant aspects of female physical attractiveness, fluctuating asymmetry (FA) and waist-to-hip ratio (WHR) were examined. Theory predicts that men who vary in sociosexuality may also vary in their mating preferences, especially when forced to make tradeoffs between desirable traits. One hundred forty men completed a sociosexuality questionnaire and evaluated a stimulus set of 10 photographic-quality prints of nude women whose measures of FA and WHR were uncorrelated. Participants ordered the images from “least attractive as a partner” to “most attractive as a partner” and rated attractiveness of each image on a scale of one to seven.

Results showed that within-participant effects for WHR and the FA x WHR interaction were moderated by between-participant differences in sociosexuality, and that FA and WHR were each significantly, inversely associated with attractiveness, when controlling for the other. These effects were qualified by a significant FA x WHR interaction: the simple effect of WHR on attractiveness became stronger (i.e., more negative) as FA decreased. Exploratory analyses revealed significant quadratic effects for both FA and WHR on attractiveness. For FA, the simple FA-attractiveness relationship was flat for lower FA scores, but became increasingly negative as FA increased. For WHR, the simple WHR-attractiveness relationship became more negative at lower WHRs. Sociosexuality lacked robust effects on the tradeoff between WHR and FA, however men appear to be concerned with avoiding high-FA females (a satisficing strategy) and with seeking low-WHR females (a maximizing strategy).

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MEN AND WOMEN DIFFER IN THEIR PREFERENCE OF RELATIVE BODY HEIGHT

The body height is an important characteristic of sexual dimorphism. In previous studies, it was found that the male body height is positively correlated with the achieved level of education and reproductive success. However, little is known whether men and women differ in their relative body height preferences. Schematic drawings of man-woman pairs which varied in their height differences were developed to test this question. The drawings were derived from average body height of Czech men and women adding or subtracting SD. This resulted in five pairs: pair 1: man the most distinctly taller; pair 2: man distinctly taller; pair 3: man less distinctly taller; pair 4: man and woman of the same height; pair 5: woman taller. These drawings were presented to 81 men and 168 women. They were asked to line up the pairs from the most to the least preferred one. As the most preferred pair by men was chosen the pair 3, followed by the pairs 4, 2, 5 and 1. As the most preferred pair by women was chosen the pair 3 followed by the pairs 4, 2, 1 and 5. There was no statistical difference between the most preferred pair and the second most preferred pair in the sample of men. Nevertheless, women significantly preferred pair with the man being taller. This preference was also confirmed by a different order concerning other than the first two positions.

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REACTION TO CHILDREN'S FACES: MALES ARE MORE AFFECTED BY FACIAL RESEMBLANCE THAN FEMALES

Because of concealed ovulation, internal fertilization, and female infidelity, parental certainty is asymmetrical; i.e., unlike females who are always 100% certain of maternity, males can never be certain of paternity. Current estimates of extra-pair paternity (i.e. cuckoldry) are between 1-20%. This asymmetry in parental certainty produces an asymmetry in human parental investment and appears to have driven the evolution of male anti-cuckoldry tactics; i.e. behavioural strategies that serve to control, prevent, and correct female infidelity in an attempt to reduce the likelihood of extra-pair paternity. Unlike females who are obligated toward parental investment because of internal fertilization, males of many species invest resources proportional to their relative certainty of paternity. However, the mechanisms driving detection of paternity are still unresolved and controversial. As an extension of our previous work, here we demonstrate a sex difference in reactions to children's faces using color morph images, which are more ecologically valid. We found supporting evidence for our original findings (Platek et al., 2002) that males are more affected by child facial resemblance when making investment decisions. These data extend and support the notion that human males may possess an evolved psychological module dedicated to kin recognition when making determinations about paternity using more ecologically valid stimuli.

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SHOULD WE USE THE ADAPTATIONIST OR THE DEVELOPMENTAL APPROACH IN EVOLUTIONARY PSYCHOLOGY?

There has been a recent debate in Psychological Bulletin about whether the adaptationist, neo-Darwinian approach or the evolutionary developmental (evo-devo) approach is most appropriate when applying evolutionary principles to psychology. Wagner (2000) argues that both approaches are relevant to biology, depending on the subject of study. When the variable under study is quantitative, for example, in the case of the common female-male sex ratio of 1:1, the explanation of the phenomenon can be given in terms of natural selection. Developmental mechanisms play no role. However, when the variable under study changes qualitatively, for example, when we want to explain the origin of eyespots on butterfly wings, we have to refer to developmental mechanisms that caused the qualitative change. Saying that eyespots enhance survival chance does not explain the origin of the eyespots. We argue that the same line of reasoning can be used in psychology. The adaptationist approach is more suitable for subjects in social psychology like sex differences in mate choice and sexual strategies. Here the variable is mostly quantitative, for example the number of sex partners one desires. Natural selection explains the sex difference. However, the evo-devo approach is more suitable for answering the main questions in developmental psychology. For example, if we like to know whether there are stages in development or not, we have to look for the mechanisms behind development. Evo-devo biology provides interesting models that can also be applied to developmental psychology. The adaptationist approach does not offer these models.

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EVIDENCE FOR COGNITIVE AND EMOTIONAL MECHANISMS PROMOTING RAPE VIGILANCE

The fitness costs associated with an unwanted pregnancy due to sexual assault are very large. Recent evidence has shown that women may have evolved behavioral tactics to avoid being the victim of sexual assault, especially around the time of ovulation. Though there are hints that cognitive mechanisms may be involved in rape avoidance (Petralia & Gallup, 2002), this topic has received little attention. In this study, we investigated the involvement of cognitive and emotional mechanisms in the avoidance of rape. Using a mixed model design, 70 undergraduate students completed both the implicit associations test (IAT) and the emotional stroop task. The emotional stroop task tested their sensitivity to sexually violent, sexual, violent, and neutral words, while the IAT measured cognitive biases for associating the concepts of man and woman with the concept of safety. We found indications of cognitive biases that affect the implicit connections people make between gender and safety. Thus, women do appear to have cognitive mechanisms that are involved in avoiding the risk of sexual assault.

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SEASONAL DEPRESSION IN EVOLUTIONARY PERSPECTIVE

Seasonal depression (SD) is understood as condition that develops in response to periodical changes of physical environment, and, therefore, the influence of these periodicities on patients' biology is suggested to be the primary and most important cause of SD. Following this paradigm, the researches have not focused their studies upon non-periodic psychosocial risk factors (PSRFs) as possible causes of SD. By contrast, the evolutionary psychological explanations predict that PSRFs play the critical role in manifestation of depression. In particular, findings on postpartum depression (Hagen, 1999) fit well in this prediction: this condition seems to be closely associated with poor social support. Only recently, the contribution of poor social support in SD has been tested and found to be significant in two studies (Michalak et al., 2001; Pilkova, Danilenko, Putilov, 2004). In brief, our explanation (Putilov, 2003) is based on idea that such emotions as sadness, grief and despair evolved as non-verbal signals aimed on alarming social environment about subjective experience of considerable lose, failure or other events associated with decrease or threat of decrease in inclusive fitness. The suffering person unconsciously expects appropriate response from his/her close social surrounding, and full-blown depression develops mostly due to deficiency of unconsciously recognized signs of such a response (i.e. because of lack of support and protection along with calming, consoling, expression of empathy, sympathy, etc). To summarize, for biological theories of SD, the association of SD with PSRFs is unpredicted finding, but it is in agreement with evolutionary psychological explanations of depression.

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SEXUAL INEQUALITY AND ITS CORRELATES: TESTING EVOLUTIONARY HYPOTHESES AT THE CROSS-NATIONAL LEVEL

Sexual selection theory suggests patterns of covariance among behavioral and life history variables that can be tested both at the inter-specific and intra-specific level. Here we use cross-country variability in a continuous measure of human polygyny to test five hypotheses derived from sexual selection theory. Based on data from a cross-cultural questionnaire study (52 countries; Schmitt, 2003) a polygyny index was calculated as the ratio of male to female variance in the number of sex partners in the past 12 months. A high index indicates a high level of polygyny in a given sample. We predicted that across countries the polygyny index should be positively associated with measures of socioeconomic inequality, violence, and sexual coercion and negatively correlated with life expectancy and age at first reproduction. With the exception of sexual coercion, all hypotheses were supported. This study indicates that sexual inequality among men may constitute a significant factor in human wellbeing.

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MEN'S RATINGS OF FEMALE ATTRACTIVENESS ARE INFLUENCED MORE BY CHANGES IN FEMALE WAIST SIZE COMPARED WITH CHANGES IN HIP SIZE

Women's attractiveness has been found to be negatively correlated with waist-to-hip ratio (WHR) in many studies. Two components of this ratio can, however, carry different signals for a potential mate. Hip size indicates pelvic size, the amount of additional fat storage that can be used as a source of energy, and the relative position of the female body mass center. Waist size conveys information such as current reproductive status, health status, or the risk of morbidity. To assess which of these two dimensions is more important for a woman's attractiveness we used a series of photographs of a woman with WHR manipulated either by hip or waist changes. In two separate studies, two different groups of men (170 in each study) assessed separately "front" and "back" attractiveness of a woman with five different WHRs (from 0.60 to 0.8, with 0.05 increments). Attractiveness was correlated negatively with WHR when WHR was manipulated by waist size. The relation was inverted-U shape (with the 0.7 as the most attractive) when WHR was changed by hip size. Men were more sensitive to the waist change than to the hip change, reliably expressing a difference in attractiveness ratings only in the former case. We postulate that in westernized societies where there is no risk of seasonal lack of food, the waist, conveying information about fecundity and health status, will be more important than hip size for assessing a female's attractiveness.

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PREDICTORS OF UNEXPECTED SEXUAL APPROACHES BY STRANGERS: WITH IMPRESSION RATINGS OF A NATURAL GAIT

It was examined whether women who frequently experience sexual approaches by unacquainted men have personality traits that afford the aim of approaching men's sexual strategy. Two kinds of approaches were examined: (1) being a target for picking up, (2) being a target for groping. Women who had been frequently targeted for picking up unexpectedly had unrestricted sociosexuality (Sociosexuality Orientation Index; Spearman's $\rho = .30$, $p < .0001$, $n = 145$). Such relationship was not observed concerning groping.

Secondly, it was examined whether male participants can choose women for making sexual approaches, based on observation of short video clips of women walking down the street. Female walkers ($n = 23$) reported the frequency of encountering sexual approaches and their personality traits (sociosexuality orientation, the Big Five, and self-monitoring). Male raters ($n = 53$) viewed randomly presented video clips (mean length: 15.7s) of the walkers, and rated their appropriateness as targets for (1) picking up, and (2) groping, and impressions of their physical traits. Men's ratings of a woman's appropriateness depended on her grooming and physical attractiveness, but corresponded with the reported frequency of actual experiences only partially. The best predictor of female experiences of having been targeted for picking up was self-rated self-monitoring trait (controlling strongly emotion expression; the trait associates with unrestricted sociosexuality). With regard to groping, female grooming and awkwardness of movement were the best predictors.

It was suggested that men choose women with unrestricted sociosexuality for picking up, through the cues of high self-monitoring expressive behavior.

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MALE DECEPTION DETECTION IN TERMS OF PHYSICAL MANIPULATION

In terms of mating strategies, deception provides benefits for both genders. It has been previously found that there are gender specific deceptive tactics in terms of mating. Specifically, males appear to deceive about their financial resources and their commitment (e.g., exaggerating their desire for marriage). Females, however, appear to exaggerate fitness and health variables. In a number of studies, we have found that females have significant insight into male deception on both a perceptual and cognitive level. In the current study, we examined male insight into female deception. In a sample of male undergraduate students, it was found that males had significant deficits in recognizing female deception along a series of dimensions. Specifically, it was found that males were deficient at recognizing deception along both perceptual and cognitive dimensions. These data support the theory that females who bear greater reproductive costs (i.e., parental investment) should be superior at detecting deception. Males, who bear much less of a cost, should have no such advantage in deception detection.

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GENDER DIFFERENCES IN PARTNERS PREFERENCES: EVOLUTIONARY AND DEVELOPMENTAL CONSIDERATIONS

Twenty nine partner preferences characteristics were factor analysed producing four psychometric reliable dimensions: Chastity/Religion, Appearance, Resources and Emotionality. In order to study the characteristics that are searched in a partner in a long and short-term relationship, tree samples were studied: 179 between 12 and 14 years; 178 between 15 and 17 years and 184 with 18 years or more. For long-term relationships, both sexes were more demanding. Females were more exigent on Emotionality and males on Chastity/Religion, Appearance, and contrary to our expectations, Resources. For short-term relationships both sexes behaved similarly. These patterns were also similar across the tree developmental groups. Although more evident in the youngest group, these patterns present a tendency to decrease with age. Our results seem to imply that partner preferences have evolved open adaptation; they appear early, the same pattern is present during development but is sensitive to environmental demands.

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SELF-ASSESSED MATE VALUE AND MATING PREFERENCES: EVIDENCE FOR A FACULTATIVE CALIBRATION

A considerable literature describes instances of assortative mating in human populations. A number of plausible explanations have been presented to explain this phenomenon. I argue that many instances of assortative mating on particular traits are by-products of matching on overall quality or fitness. Given that the strategy of fitness-matching is not invadable by the strategy of accepting mates only of higher quality than oneself, it behooves the individual to form a more efficient search strategy. One possible strategy is an unconscious adjustment of one's attraction, such that individuals of either sex will be

disproportionately attracted to those of the other sex whose objective physical attractiveness is indicative of someone who would nearly match the judge's own mate value (thereby efficiently reducing wasted mating effort in competition against one's superiors). More precisely, I hypothesize that selection has favored individuals the typicality of whose assessments of physical attractiveness were proportional to their own mate value. My prediction, therefore, is that any valid measure of an individual's mate value should correlate positively with the extent to which his or her assessments of opposite sex attractiveness are typical of how their same-sex cohort judges attractiveness. In each of three studies, I collected a measure of participants' mate value and had participants rate physical attractiveness for a series of opposite-sex photographs. Using principal components analysis, I calculated for each participant a score indicating the typicality of the ratings they assigned. In each study, the prediction was supported for male but not for female raters.

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SOCIOSEXUALITY ACROSS 48 NATIONS: A CROSS-CULTURAL STUDY OF SEX, GENDER EQUITY, AND THE REPRODUCTIVE ECOLOGY OF HUMAN MATING STRATEGIES

The Sociosexual Orientation Inventory (SOI; J.A. Simpson and S.W. Gangestad, 1991) is a self-report measure of basic human mating strategies. Recently, the SOI was translated from English into 25 additional languages and administered to 14,059 people across 48 nations. SOI responses indicated: 1) the SOI possesses adequate reliability and validity within and across a diverse range of modern human cultures, 2) operational sex ratios and reproductively demanding environments relate in evolutionary-predicted ways to national levels of sociosexuality, 3) sex differences in sociosexuality are robust and universal across 48 modern nations, and 4) sex differences in sociosexuality are significantly larger when local ecological environments are demanding, and appear attenuated to more moderate levels in cultures that possess more gender equality.

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SHIFTING ATTITUDES TOWARD SEXUAL ACTIVITIES ACROSS THE MENSTRUAL CYCLE: ARE WOMEN MORE CHOOSY DURING THE FERTILE DAYS OF THEIR CYCLE?

Mate choice is crucial for women: making a false decision could result in high costs. This decision is even more crucial during the fertile phase in the menstrual cycle. We hypothesized a systematic shift of women's attitudes toward sexual activities across the menstrual cycle. 53 women ($n = 28$ normally ovulating and $n = 25$ "pill" users) completed a German version of the "Sociosexual Orientation Inventory" (SOI; Simpson & Gangestad, 1991; $\alpha = .69$) and a questionnaire containing demographic information. Using the backward method (Thornhill & Gangestad, 1999) and the tables of Jöschle (1973), we estimated each woman's "conception" probability. We found a significant negative relationship between

SOI and conception probability in the normally ovulating group ($r = -.44, p < .05$). Using two subscales of the "Sociosexual Orientation Inventory": behavior (items 1 – 3; $\alpha = .68$) and attitude (items 4 – 7; $\alpha = .76$) we found that this effect greatly depends on the attitude scale ($r = -.550, p < .01$) compared to the behavior scale ($r = -.19, p = .33$). As expected, we did not find any systematic variation between the female cycle and sociosexual orientation among the pill users. These results suggest that women adopt their attitude and, perhaps their willingness, toward sexual activities dependent on their menstrual cycle: higher conception probability is associated with higher restrictiveness. Open questions for future research are discussed.

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AGGRESSION, EMPATHY AND SEXUAL ORIENTATION IN MALES

Homosexuality represents an evolutionary puzzle; why is a trait that significantly lowers an individual's reproductive success maintained in human populations? Miller (2000) hypothesises that male homosexuality is maintained as a polygenic balance polymorphism, with the relevant genes functioning in a pleiotropic manner. Thus the expression of homosexuality can be understood in terms of a threshold liability model. Males who possess these genes are desensitised to androgens encountered during development and subsequently express more characteristics that are typical of females. Specifically these are prosocial characteristics, such as lowered levels of direct physical aggression and greater levels of empathy. Such traits improve the male's ability to act as long-term partner, and potentially a parent, thus the genes responsible are maintained in the population.

Previous research indicates that homosexual males, as compared to heterosexual males, display lowered levels of direct physical aggression and higher levels of empathy. However research has yet to directly address how these characteristics relate both to each other and to other features important for long-term mating (i.e. levels of in-direct aggression and an interest in having children). This study addressed this issue and compared scores from heterosexual and homosexual males for these variables. The findings of this study are discussed in light of Miller's original hypothesis.

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SMELLING A PARTNER'S CLOTHING DURING PERIODS OF SEPARATION: PREVALENCE AND FUNCTION

Scattered reports in both the scientific and popular literature, as well as personal anecdotes, suggest that it is not uncommon for women to deliberately smell their sexual partner's clothing, especially when separated. To our knowledge there has been no documentation of the frequency of this behavior. We asked 108 undergraduate men and women who were, or had ever been, in a committed heterosexual relationship if they had ever deliberately smelled their partner's clothing, or slept with an article of their partner's clothing, during periods of separation. 72% of the women and 27% of the men had slept in or with their partner's clothing while separated. Additionally, 87% of the women and 56% of the men deliberately smelled their partner's shirts or blouses. Many participants reported the odor comforted them. We discuss possible functions of this behavior. Individuals may be evaluating their partner's MHC or other signals of health provided by odor, but that would not explain why the behavior occurs in the partner's absence. Attractiveness of a partner's odor may derive from its value in signaling the fitness benefits provided by a mate's presence. The sex difference may reflect the fact that women especially benefit from the protection provided by a mate, or the greater choosiness of women in mate selection (Buss & Schmitt, 1993). However, in contrast with the finding of Herz & Cahill (1997) that women placed greater importance on their partner's odor, we found no sex difference in the reported interest in the partner's odor when present.

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THE EFFECTS OF ZOLOFT ON MOOD AND EMOTIONAL RESPONSE IN HEALTHY ADULTS

Despite the involvement of serotonin in affective disorders, its role in the processing of affective stimuli has not been investigated. Furthermore, the effects of SSRI's on mood in healthy adults remain unclear. Previous research from our laboratory administering fluoxetine to healthy participants has indicated that serotonin is associated with a constraint of mood and social defenses. The current study further investigated these questions with a battery of questionnaire and neurophysiological measures of affective processing and mood. Sertraline (50mg/day), or a placebo was administered to 38 healthy participants (23 women) for 21 days. On day 21 participants viewed affective pictures and completed tasks assessing attention and memory while physiological measures were recorded. Personality and mood questionnaires completed at baseline were re-administered. Initial results indicate a decrease in negative affect and an increase in positive affect, across both behavioural and physiological measures in the sertraline group. Indeed, in contrast to the earlier findings with fluoxetine, participants show increased responsivity to non-social pleasant stimuli. The specificity of sertraline's action on the serotonergic system, versus a secondary pharmacologic mechanism such as dopamine reuptake inhibition, requires further investigation. The use of more specific pharmacologic agents may clarify this issue.

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ON WHAT VISUAL AREAS ARE HUMAN ATTRACTIVENESS JUDGEMENTS BASED?

Evidence suggests visual cues to attractiveness in the human body are those which are honest signals of health and fertility, e.g. body-mass index (BMI) and waist-hip ratio (WHR). It is unclear from previous research what is the visual information is extracted from images on which observers base their attractiveness judgements. To this end, it is possible to apply psychophysical techniques such as eye-tracking and backwards visual masking designs. Experiment 1 demonstrated that when observers make attractiveness judgements on colour photographic images, gaze is concentrated in the upper-middle torso area in an up-down movement. Rather than predicting attractiveness judgements, which were akin to previous studies of similar design, the eye-movements are rather evidence of an efficient visual foraging strategy. Experiment II examined eye-movements of observers in a two-alternative forced-choice design, whereby observers made preferential judgements between images presented in pairs. The foraging strategy was extended: the left-hand image was examined in a similar fashion to Experiment 1, followed by a relatively brief appraisal predominantly confined to the lower torso of the right-hand image, suggesting a different pattern of visual information extracted when deciding to accept/reject the second image. Attractiveness judgements in Experiment 2 displayed large intraclass correlation (Strout-Fleiss reliability score of 0.9) yet were not predicted by parameters such as BMI and WHR, suggesting more complex choice effects are present. These experiments have been extended using a backwards visual masking design controlling the amount of information accessible to subjects from images: these results will be presented at the conference.

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HADZA WILDLIFE RESOURCE SURVEY

The Hadza are the only hunter-gatherers who live in a savanna environment rich in wildlife; in contrast to other hunter-gatherers they have not been pushed into a marginal environment. Meat consumption is of fundamental importance in the Hadza diet. By far the most important source of meat is large ungulates. This paper relates meat consumption to the wildlife populations by presenting results of dry and rainy season aerial and ground surveys of the area occupied by the Hadza. In a 3775 km² area there were an estimated 18,000 large animals or about one ton large wildlife biomass per km². Within this area, there were 458 Hadza were living in camps in the dry season, and 402 Hadza in camps in the wet season. By harvesting 4 to 5% of the wildlife biomass per year, each Hadza gets an average of about 500 grams (edible portion) of meat per day.

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WHINES: BAD HABIT, OR PART OF THE HUMAN ATTACHMENT SYSTEM?

Whining, far from just a bad habit, seems to be a functional element of the human attachment system. It shares a similar structure with both child-directed speech and infant cries, and all three are effective in attracting attention from either attachment partner (Sokol et al, submitted). One method for judging the attention grabbing power of a stimulus is by measuring its power to distract. For instance, Morsbach et al (1986) found that infant cries are more distracting to mothers than machine noise. If whines, infant cries, and child-directed speech are serving a similar function, then these vocalizations should all be more distracting than machine noise, and adult-directed speech. A preliminary investigation supported this hypothesis. Further males were significantly less distracted only by whines, infant cries, and child-directed speech than females. This suggests that these three vocalizations are adapted to facilitate the human attachment system.

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SEX (OR STRATEGY) DIFFERENCES IN JEALOUSY?

Previous research on sex differences in jealousy has demonstrated that men are most upset by sexual infidelity, while women are most upset by emotional infidelity. These differences are usually explained by differences in the confidence that men can feel that they are raising their own children, and the confidence that women can feel that their mate will stay to provide resources for child raising. The current study assesses both the effect of the type of mating strategy used on jealousy, as well as the effect of sex on jealousy. We suspect that the sex difference is contingent on the type of strategy used. Mating strategy was determined by asking participants which characteristics they prefer in an ideal mate. Participants also answered the classic forced choice question regarding infidelity. Results show that in addition to expected between sex differences for the forced choice measure, the gender effect is dependant on the type of attributes preferred in a mate. Both men and women who chose emotional infidelity as most upsetting preferred the "long term" qualities of success, education, commitment and faithfulness in an ideal mate, (which suggests a long term mating strategy) while women and men who

chose sexual infidelity as most upsetting did not prefer these qualities in their ideal mate. The results suggest that mating strategy contributes to sex differences in jealousy, and that the classic sex differences in jealousy reflect differences in the two sexes' probability to adopt short or long term mating strategies.

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A PRELIMINARY INVESTIGATION OF THE RELATIONSHIP BETWEEN ATTACHMENT AND EMOTION SELF-PERCEPTION

Previous research in social psychology has shown that people differ in how much their emotional feelings are based on cues from their bodies. The emotional experiences of some people, identified as situational cuers, are determined by cues such as environmental cues, people surrounding the person, or social norms. These people are relatively unresponsive to bodily changes. The other group, identified as personal cuers, experience emotion as a result of their facial expressions, physiological changes, and body postures. An evolutionary explanation of this well-documented fact is that it occurs because of the operation of a cognitive module designed to enable the organism to predict its own impending behavior. We theorize that securely attached children and conservatively reproducing adults should be situational cuers since the environment is stable and provides reliable and predictable information to the person about their future actions. Conversely, insecurely attached children, and unconservatively reproducing adults should be personal cuers since the environment is instable and unpredictable and does not provide reliable information to the person about their future actions. Results support this hypothesis, that attachment is related to emotion self- perception.

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RELATIONSHIPS BETWEEN BIRTH ORDER AND PERSONALITY TRAITS AS A FUNCTION OF DIFFERENTIAL LEVELS OF MATERIAL AND SOCIOEMOTIONAL PARENTAL INVESTMENT

Facing the prospect of producing several offspring over a lifetime, human parents have been selected to make adaptive decisions about when and how much to invest in each child. On the other hand, children have been selected to increase the level of parental investment by employing particular developmental strategies. As a result, children of different birth orders may manifest different personality characteristics (Sulloway,1997). Such birth order effects are presumably a function of the level or type of parental investment secured by children of different birth orders. To test this supposition, we examined relationships among birth order, two types of parental investment (material and socioemotional), and scores on the Revised NEO Personality Inventory (Costa & McCrae, 1988) in 448 university students. Total parental investment did not differ according to birth order, but firstborns received higher levels of material investment and lower levels of socioemotional investment compared with laterborns. Additionally, laterborns obtained higher scores on Extraversion and Agreeableness domains of the NEO-P-I-R , but did not differ from firstborns on most facets of Neuroticism, Openness, and Conscientiousness. As expected, measures of parental investment appeared to be better predictors of personality traits than birth order. These results are discussed in light of a number of methodological issues and in terms of parent and offspring strategies acting to equalize total investment in children of different birth orders.

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MATE PREFERENCES IN HIGH AND LOW SOCIAL STATUS GROUPS

The aim of this internet-based study was to test the hypothesis that not only sex, but also the social status, influences the importance and desirability of certain characteristics of a potential mate. Two extreme groups of heterosexual participants were selected from a larger sample (N=2675): "high-status group" - subjects who reported having high-income and high education and who rated themselves as above average looking (N=91) vs. "low-status group" - those who reported having low income and low education and who rated themselves as average or below average looking (N=82). Participants rated the importance and desirability of 18 characteristics (drawn from the Buss et al., 1990 study) of a potential mate on a four-point scale. MANOVA showed statistically significant main effects of sex and social status, as well as their interaction for some of the rated characteristics. Results are discussed in terms of mate-selection theories.

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SEX, ATTRACTIVENESS, AND COOPERATION IN SOCIAL EXCHANGE

The logic of female choice (Trivers, 1972) and strategic pluralism in mating (Gangestad & Simpson, 2000) leads us to predict that physically more attractive men of high genetic quality are more likely to cheat and less likely to cooperate in social exchange relations than physically less attractive men, while physical attractiveness has no effect on women's tendency toward cheating or cooperation. We tested this hypothesis by letting male and female students rate facial photographs of the male and female game players who participated in one of four different experimental games (Prisoner's Dilemma, Allocator Choice, Faith, and Trust), and found support of this prediction. Both male and female raters judged the faces of male defectors more attractive than the faces of male cooperators, but they did not give differential attractiveness ratings to female defectors and female cooperators.

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ARE FACIAL EXPRESSIONS CONTAGIOUS IN THE JAPANESE?

Previous studies have shown that facial expressions of emotion are contagious - a phenomenon known as facial mimicry (Hess & Blairy, 2001; Lundqvist & Dimberg, 1995). Despite the potential significance of this phenomenon to help us understand the evolutionary origins of emotions, there has been no study that has examined facial mimicry with Japanese samples. The purpose of this study was to examine the phenomenon of facial mimicry in a Japanese population. We used photographs of faces expressing 'happiness', 'sadness', 'anger' and 'disgust', adapted from Matsumoto and Ekman (1988), as experimental stimuli. Following the procedure of Hess and Blairy (2001), neutral faces and emotional faces were presented sequentially. The degree of participant's facial mimicry was measured by the difference in electromyography (EMG) activity when presented with a neutral face and when presented with an emotional face of the identical target person. Results showed that, in line with the previous studies, participant's *Corrugator supercilii* muscles were stimulated by the 'angry' and 'sad' faces. Further,

Zygomaticus major and *Orbicularis oculi* muscles were stimulated by the 'happy' faces and *Levator labii alesque nasii* muscles by the 'disgusted' faces. However, contrary to expectation, *Zygomaticus major* and *Orbicularis oculi* muscles also responded to the 'angry' faces, and the *Levator labii alesque nasii* muscle also responded to the 'happy' faces. We also analyzed self-reports of the participants' emotional experiences in responses to the facial expressions. Implications of these findings for 'emotional contagion' are discussed.

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ROBUST BEAUTY OF THE MAJORITY RULE UNDER UNCERTAINTY: AN EVOLUTIONARY COMPUTER SIMULATION AND A BEHAVIORAL TEST

Group decision making is a commonly-used cultural device in many societies including tribal as well as industrialized societies. This paper explores the adaptive functions of the simple majority rule under uncertainty. Implementing a Brunswikian adaptive environment in the computer where the state of the environment is known only imperfectly from stochastic cues, Hastie & Kameda (2004) has shown that the majority rule outperforms the other rules (especially the best-member rule) across broad parameter settings. We extended Hastie & Kameda's (2004) paradigm, conducting an evolutionary computer simulation that focused specifically on the free-rider problem inherent in group decision making (e.g., "voters' paradox"). The results showed that, for a wide range of parameters, (1) sincere members who engaged in costly information-search and voting did persist in a group under majority rule, and that (2) the net productivity of the majority rule was higher than that of the best-member rule. We tested these notions by a behavioral, interactive experiment with human participants. The results supported our predictions. We argue that the simple majority rule may qualify as a fast and frugal heuristic under uncertainty with its marked adaptive efficiency, although its logical incoherence (e.g., Arrow's impossibility theorem) has often been emphasized in the social choice literature in political science and economics.

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Poster 94

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LEVEL OF RELATIONSHIP STATUS AND SALIVARY TESTOSTERONE IN HETEROSEXUAL MEN

The process of romantic attachment in many societies is generally characterized by a progression from singlehood to dating to exclusive attachment and finally to a long-term committed relationship. Previous research has established that (presumably heterosexual) men in the final stage of romantic attachment have lower salivary testosterone (T) than single men. The present study examined how the above four levels of relationship status (single, dating, monogamous, long-term partnered) are associated with T levels. Data were collected from heterosexual men between 17-56 yrs of age. Evening saliva samples were collected between 1700 and 2000 hrs. Data were collected about participants' demographics, as well as relationship status and quality. Level of relationship status was significantly and negatively correlated with T. Presence of sexual activity was significantly and positively correlated with level of relationship status, but negatively with T. Thus, sexual activity may mediate the relationship between T and relationship status. The results are interpreted within two complimentary frameworks: partner competition and sexual access.

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Poster 95

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THEORY OF CULTURAL EVOLUTION

I propose some central issues of cultural evolution. The core element of cultural evolution is cune. I define cune as follows: Cune is any innovation. It can be a material thing like a tool, but also an immaterial thing like a new application of an old innovation or an intellectual abstraction like a hunting strategy or norm. Cunes are replicated by copying or teaching. Mainly they spread if the culture that carries them is successful. The unit of cultural evolution is cuorgan. That is any group of people that carries certain cunes; originally a band, then ethny, tribe, state or another organization. Cunes of a cuorgan form alltogether an entity that can be called cunome. The difference between cunes and genes is that the 'mutations' of cunes happen by change – many of the great innovations of science and technology has been made by change – but by reasoning. Cultural evolution is Lamarckian. Cunes go much further off to the past than the human race. The species Homo Habilis and Homo Erectus had cunes (tools, fire) as well as Australopithecus very likely have had them. Even chimpanzees have them. Some groups use sticks made of a branch of a tree to catch termites and some use 'anvils' and 'hammers' to crack nuts. Cunes gave new speed to evolution of brains of hominids. Those individuals and groups, who were capable to copy old and invent new cunes, must have had an advantage in reproductive success.

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Poster 96

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FACIAL PERCEPTION AND MATING STRATEGY AS A FUNCTION OF DIGIT RATIO AND MENTAL ROTATION IN HUMAN MALES

Gender is the most salient social category in all human communities, and gender's influence is observed within all known languages, past and present, and it is the primary factor that influences life roles, occupations, relationships, abilities, mating opportunities, and guides interpersonal interactions with both children and adults. Few would argue that the primary cause of the physical variation between genders is mediated by sex hormones. It may be plausible that cognitive variations both between genders and within a gender are mediated by sex hormones. This research will attempt to explain that digit ratio and mental rotation may be reliable correlates of sex hormone influence. This research will give an overview of parental investment theory, an overview of factors that contribute to the perception of female beauty (the perceived), and examine how correlates of sex hormone influence (digit ratio and mental rotation) may be related to male facial preferences for female faces and systematic differences in mating strategy. This research will attempt to explain that the perception of beauty is influenced through the complex interaction of the varying hormonal markers in female faces (the "perceived"), and the hormonal factors of the observer (the "perceiver"). Results will be interpreted from an evolutionary psychology perspective.

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Poster 97

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FISHING FOR CONSUMERS' ATTENTION

Due to evolutionary history humans seem to appreciate certain environmental stimuli. Settings of preference share features as water, plants, animals as well as elements of mystery and prospect-refuge

(Orians and Heerwagen 1992). Following Attention Restoration Theory, the former also represent qualities of settings which help to recover from attentional fatigue ubiquitous in urban habitats.

In our study, we investigate the influence of an aquarium as environmental stimulus located in a window display in a shopping mall. The response of passers-by is measured by behavioural observation via hidden video camera. Analyses comparing periods of presence and absence of the aquarium are conducted on a sample of 1002 focal subjects out of 12921 observed persons. Data confirm the predicted prolonged duration of stay, of turning to the window and longer stops when the aquarium is present.

Our findings contribute to the exploration of human biophilia by showing that humans are despite of all distance to the natural environment still subject to their evolutionary shaped response mechanisms. The study does not only empirically support the hypotheses mentioned above, but also shows how behavioural science can lead us towards a deeper understanding of humans living under urban conditions.

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Poster 98

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TATTOOS AND PIERCINGS AS SEXUALLY-SELECTED SIGNALS? A PILOT STUDY OF BODY ORNAMENTATION IN GERMANS

Body modifications such as tattoos and piercings have increased tremendously in popularity in recent years. These ornaments are distinct from other forms of body decorations because of their costs, permanence and cultural diversity. We are interested in a potential signalling function of tattoos and piercings in the context of sexual selection. In order to establish whether some of these ornaments have a function in mate choice and or competition for mates, we examined their prevalence and position on the body for sex and age effects. Face-to-face questionnaires presented to a representative sample of the German population (n=2507) in July 2003 provided data on the possession and position of tattoos and piercings. We found that significantly more women than men were pierced, whereas the sexes did not differ in the proportion of tattooed individuals. Furthermore, men and women differed significantly in the proportions with which different parts of the body were ornamented. Most men decorated their arms, whereas women exhibited a preference for the face. Finally, the proportion of individuals between ages 14 and 34, i.e. those presumably most active on the mating market, had significantly more ornaments, while people over 45 were less often ornamented than expected. Because tattoos and piercings are part of a fashion adopted by mostly young people, who exhibit sex-specific preferences for the type and position of these ornaments, we conclude from this pilot study that mechanisms of sexual selection may influence some people's decision about acquiring and placing such an ornament.

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