

**XIX Biennial Conference
of the
International Society for Human Ethology**

Abstracts



**Alma Mater Studiorum
University of Bologna, Italy
July 13 – 18, 2008**

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of the
International Society for Human Ethology**

Abstracts

Edited by

Marco Costa, Stefano Tampellini

**Alma Mater Studiorum
University of Bologna
Italy**

July 13 – 18, 2008

Front cover:

Hand Cave at Pinturas River Canyon, Patagonia, Argentina

Himba: raising of eyebrows (“eyebrow-flash”). Photo: I. Eibl-Eibesfeldt.

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Part I

Monday, July 14th 2008

Plenary Session

1

Motor cognition and its role in the phylogeny and ontogeny of intentional understanding

Vittorio Gallese

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Social life rests in large part on the capacity to understand the intentional behavior of others. Which are the origins of this capacity? How is to construe its development in ontogenesis? By taking for granted that intentional understanding can be explained only in terms of the ability to read the mind of others, i.e. to represent them as having mental states, the traditional view claims the existence of sharp discontinuity in both its phylogeny and ontogeny. Over the last few years this view has been challenged by a number of ethological and psychological studies as well as by several neurophysiological findings. In particular, the functional properties of mirror neuron systems and its direct matching mechanism indicate that intentional understanding is primarily based on the motor cognition that underpins one's own capacity to act. In my talk I will discuss the pivotal role of motor cognition, providing a biologically plausible and theoretically unitary account of the phylogeny and ontogeny of intentional understanding.

Attractiveness and Mating 1

2

Variable preferences for sexual dimorphism in stature

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In contemporary Western populations, some physical characteristics are sexually dimorphic, and it is known that these traits affect human mate preferences. Previous studies have revealed that male stature is a key predictor of female responses to male targets (e.g. [Fan et al., 2005], though not all show that taller men are the most preferred (Graziano, Brothen, & Berscheid, 1978). Sheperd and Strathman (1989) reported that females expressed a preference for dating males taller than themselves and dating them more frequently, but they did not rate them as more attractive. Shorter females in contrast were preferred more as dates, were dated more frequently, and were also rated as being more attractive than taller females. In a sample of over 3000 males, Pawlowski, Dunbar, and Lipowicz (2000) found that taller men had greater reproductive success (i.e. they were significantly more likely to have at least one biological child) than shorter males. Kirchengast (2000) examined similar associations in male and female members of a !Kung San population. A significant relation between fertility patterns and body dimensions was found, though these patterns differed between the sexes. In males, tallness was associated with a higher number of surviving children, whereas smaller females had more offspring. However, relative height is also important with 'Sexual Dimorphism in Stature' (SDS) calculated as male height/female height. Pawlowski (2003) showed that people adjust their preferences for SDS in relation to their own height in order to increase their potential pool of partners. The aim of the present study was to replicate Pawlowski's study on a larger sample of participants, and to investigate the universality of the reported preference adjustment within European societies. Data from three countries (Germany, n = 616, Austria, n = 336 and the UK, n= 239) were collected that confirm Pawlowski's original data. In all three countries, women more frequently reported a preference for being a member of

the romantic partnership with figures where the man was taller. The adjustment of SDS preferences in relation to own height was found to be significant in all three countries, this being true for both, males and females. Similar results were obtained with reports of SDS of actual partners as dependent variables, with the exception of British males, which showed no significant effect. It is therefore likely that the preference adjustment in relation to own height, as originally reported, is a genuine effect in Western societies. The obtained relationship may, as Pawlowski (2003) claimed, serve to increase the pool of potential partners.

Mate choice in spanish homosexuals: A study based on personal advertisements

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Homosexual behaviour is a topic that has received little research from an evolutionary perspective. Most of the research done thus far tends to fall into two broad categories: a) the research for an adaptive explanation of homosexuality, and b) the study of homosexual mating patterns to find out about heterosexual preference mechanisms. Although homosexual mate choice seems to violate the evolutionary principles, one adaptive explanation is the Alliance Theory in which homosexual behavior evolved in order to secure same-sex alliances during hominid evolution. Same-sex alliances are important for gaining status and eventual access to females in many primate species, including humans. According with this theory, homosexuals seek mainly to establish alliances, for example, through long term stable relationships with older mates with higher socioeconomic status than short term sexual relationships. Our aim is to explore the mating preferences in Spanish homosexuals through the analysis of personal advertisements, and see if our results match some predictions of the Alliance Theory. We collected personal ads of homosexuals from several Spanish media, which included daily newspapers, homosexual-oriented magazines, and contact websites. We obtained a total of 1107 ads of which 848 (76.60% of the total) were from men and 259 (23.40% of the total) were from women. Mean ages were 34.23 + 9.81 yrs for men (range 18-60 yrs), and 32.35 + 9.69 yrs for women (range 17-63 yrs). We took into account the different purposes (stable relationship, friendship, sex), and age groups (<30, 30-39, 40-50, >50) of advertiser. In each ad we recorded the following traits sought/offered by men and women: physical attractiveness, socioeconomic status, emotional stability, sincerity, sympathy, and required age. We found that men offer significantly more traits than women (men: 3.04; women: 1.42), men advertisers demand a mean of 1.80 traits, while women require a mean of 1.31 traits. Most (41%) of the ads of men sought sex, while most of the women's ads (37.8%) sought friendship. Across all the different ads' purposes, men offer physical traits more often, without significant differences between the purposes. Men prefer mates on average 1.23 years younger than themselves, whilst women prefer mates about their same age. However, these differences in age requirements vary according to advertiser's age. Young women (under 30) seek women 1.52 years older than themselves, but as the advertiser women's age increases, the age difference decreases slightly below their age. In contrast, this effect is reversed in the case of men: those under 30 seek men 3.79 years older than themselves; as men's age increases, the age difference with respect to the men

they seek reverses, preferring mates 12.77 years younger than themselves in those over 50. Age and physical attractiveness are the traits most sought by men. Women also seek age and physical attractiveness most in the friendship and sex purposes, but in the long term relationship purposes, they mainly seek age and emotional stability and offer both physical attractiveness and emotional stability. We can generalize that socioeconomic status and sympathy are the traits least sought by men and women. As a conclusion, our results do not support the Alliance Theory for evolution of homosexuality.

Cross-cultural recognition of alternative male mating strategies

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Research on human sexuality suggests that both men and women have evolved to pursue both short-term and long-term mating strategies. We developed personality sketches from passages describing the proper and dark hero characters that define the Romantic period of British literature, which respectively represent long-term “dad” and short-term “cad” male mating strategies. In previous studies, North Americans correctly identified features associated with short-term and long-term male mating strategies and expressed preferences that would enhance their own reproductive success. Women preferred men with features suggesting reliable provisioning for long-term relationships, but the majority preferred men with features indicating high phenotypic quality for a brief sexual affair. Critics have charged that both the character descriptions and these results reflect gender stereotypes in British-derived cultures. We hold that recognition of alternative male mating strategies is a human universal, although cultural variation in social norms for female sexuality may influence women estimated likelihood of having different types of relationships. This study replicated and extended previous findings with samples from non-English speaking cultures. Passages were converted into simplified English and translated into Arabic, Chinese, Croatian, German, Hebrew, Hindi, Japanese, Korean, Russian, Serbian, and Spanish. Participants in other nations completed a survey on hardcopy or over the Internet. Participants rated each character on a variety of behavioral attributes consistent with short-term and long-term mating strategies, features which were not included in the character descriptions. Female participants estimated the likelihood of having long term committed, short-term (2 months), and brief sexual relationships with each character separately and chose the man they would prefer for: a companion on a week-long vacation, marriage, a fiancé for their 25-year-old daughter, and a brief sexual affair. Men estimated the likelihood that women would predict these types of relationships with each character and chose the man they would prefer for: a companion on a week-long vacation, a long term business partner, a fiancé for their 25-year-old daughter, and a neighbor. Results confirmed the predicted pattern of relationships. Samples from North America, Argentina, Croatia, Israel, and South Korea were large enough (over 120 participants) to enable Confirmatory Factor Analyses of the behavioral attribute items. The CFAs with data from each sample indicated that that short-term/high mating

effort/risky strategies and long-term/ high parenting effort/risk adverse strategies were distinct but inversely related dimensions. Items loaded as predicted across samples and scores were accurately associated with each character sketch; proper hero “dads” were rated substantially higher on long-term/ high parenting effort/risk adverse strategies and lower on short-term/high mating effort/risky strategies than were dark hero “cads.” Across cultures, women’s estimated likelihood of a relationship with the proper hero “dad” decreased as the length of the prospective relationship decreased. In most cultures, women’s estimated likelihood of a relationship with the dark hero “cad” increased as the length of the prospective relationship decreased. South Korean women, who live in a relatively more sexually conservative society, had low estimated likelihood of brief sexual affairs for both characters. Males accurately estimated women’s predicted relationship patterns. Across all cultures, women were more likely to choose the proper hero “dad” for marriage and a son-in-law, but were more likely to choose the dark hero “cad” for a brief sexual affair. Across all cultures, men chose the proper hero “dad” more often for a long term business partner, a son-in-law, and a neighbor. There were no consistent preferences for a vacation companion. Our results indicate that alternative male mating strategies and the ability to identify them are human universals, rather than products of a particular culture. Social norms do influence the expressed likelihood of certain relationships, although women respond adaptively when necessary.

Personality and Attachment

3

An evolutionary perspective on the effects of parenting on attachment

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It is frequently asserted that shared-environmental influences on personality are practically non-existent and that parents have no lasting socialization effect on their children. In this paper we shall argue the inverse, that parenting effects on child outcomes such as attachment can be dramatic, without implying that such effects are automatic, or true for all parents. Our logical and empirical arguments are formulated within the framework of life history theory. Life history theory has provided new perspectives in understanding many aspects of human reproductive behavior, including parental investment and attachment. An individual's reproductive strategy must optimally partition mating and parenting effort depending upon available resources. In resource rich environments, characteristics such as intimate pair bonding between parents, relatively low fertility, high-investment parenting, secure attachment with offspring, and delayed maturation of the young are likely to be adaptive, and researchers report large inter-correlations substantiating this view with parenting variables accounting for 20% to 50% of the variance in child outcomes. Behavior genetics research also demonstrates that shared environmental influence is substantial and heritability is near zero for quality of attachment, the inverse of typical results for personality traits. Still, we can think of at least three possible reasons for consistently underestimating shared environmental effects. First, if children's inborn traits are responded to differently by different mothers, this would lead to underestimating true shared environmental effects since behavioral genetics analyses would average across and thus nullify these effects of parents. For example, several studies have shown that some mothers withdraw from difficult infants while others increase their caregiving. Second, if the infant's genetic traits evoke consistent responses from different parents, this evocative gene-environment correlation would be subsumed under "genetic effects". Third, Children would be expected to differentially benefit from the environments provided by high-investment parents and the result would be a substantial passive GxE correlation that would also be subsumed under genetic . Parents and their children are a co-evolving system in which

genotype-environment correlations are likely to be of great importance. The causal chain between genes and phenotypes is a long one, with G/E interwoven at every step. The distal effects of genes often depend on environmental triggers or enabling conditions, and the effects of different environments depend on the genetic characteristics of the individuals encountering an environment. But GxE covariances are subsumed under genetic effects if one adopts the additive assumption of the behavior genetics model. Because of the problematic assumptions of the additive model underlying behavior genetic research, we believe that there is no substitute for directly studying how the environment affects the individual. What can more direct studies tell us about gene-environment interaction? In rhesus monkeys that experienced insecure attachment relationships, a specific polymorphism in the serotonin transporter gene is associated with extreme aggression and excessive alcohol consumption. However, these genetic effects were not observed in monkeys who developed secure attachment relationships with their mothers during infancy. The quality of their early experience appears to buffer these monkeys against the deleterious effects of the gene and provides a nongenetic mechanism for transmitting these patterns to subsequent generations. Summarizing human data on temperament effects on attachment quality, research has not demonstrated that inherited temperament can have a direct effect on attachment quality, although infant characteristics exert an important indirect influence whenever they affect quality of caregiving. Newborns with neurological problems were not more likely to be classified as insecurely attached, except when this factor was combined with low levels of social and emotional support for caregivers. Infant proneness to distress was not predictive of anxious attachment, except in combination with high levels of maternal controllingness. In a high-risk sample, mothers of future avoidant infants ignored infant crying for relatively long periods, and were more distant in their soothing attempts, and minimally responsive to the few positive expressions of their infants. This is consistent with previous work in terms of child effects on maternal behavior (prolonged infant irritability suppresses maternal sensitivity) followed by maternal caregiving effects on type of attachment classification. To the extent that attachment security is not genetically determined, but rather shaped by the caregiving environment, researchers should be able to demonstrate that 1) attachment security can change during infancy; 2) these changes are meaningfully related to corresponding changes in the caregiving environment; 3) interventions that are successful in improving caregiver sensitivity and responsiveness also increase infant-caregiver attachment security; 4) quality of attachment may vary depending upon whether the infant is assessed with mother or father; and 5) infants showing identical patterns of attachment can have different temperaments. All five of these predictions have been supported by empirical evidence.

The genetics and evolution of the the general factor of personality

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Unlike conventional personality psychology, life-history theory predicts hierarchically organized traits, culminating in a single and heritable general factor. Three data sets were examined. In Study 1, 214 university students completed 36 personality scales. In Study 2, 322 pairs of monozygotic (MZ) and dizygotic (DZ) twins completed 29 5-point rating scales plus questionnaires. In Study 3, 575 pairs of 2- to 9-year-old Korean twins were rated by their mothers on

25 temperament scales. Analyses confirm a general factor of personality (GFP) at the apex of a hierarchical organization. Intermediate are the Big Five factors of Openness, Conscientiousness, Extraversion, Agreeableness, and Emotional Stability, and the EAS temperament traits of Emotional Stability, Activity, and Sociability. At the third level are some 36 particular traits and temperament scales. At the base are dozens of particular items. Analyses of the twin data show GFP has an early age of onset with 50% of the variance attributable to non-additive (dominance) genetic influence and 50% to non-shared environmental influence. Natural selection may have acted directionally to endow people with more cooperative personalities than their archaic ancestors.

Accuracy of personality judgments made on the basis of composite pictures

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Several studies showed that faces contain cues referring to an individual's personality. Moreover, there is evidence that some of the personality traits (Extraversion and Conscientiousness in particular) are perceived accurately in unknown individuals solely on the basis of facial appearance. Reported high agreement between judges from different cultures, sexes and age suggests that evolutionary framework represents a suitable approach in interpreting the results of personality perception studies. Using composite pictures in studies on personality perception from faces has become a well-established technique. It allows researchers to create composite images capturing physical traits common to the included individuals while minimizing the presence of individual facial characteristics. Two previous studies aimed to find out whether beholders are able to perceive personality difference in composite images created from photographs of people scoring high and low on Big Five Factors. Composites of people high on Extraversion, Conscientiousness, Agreeableness and to some extent also Emotional Stability were perceived accurately on congruent traits. In this study we used similar experimental design as the above mentioned studies but the target's personality profile was assessed by Cattell's 16 PF questionnaire instead. In total, 44 composite faces were created (2 x 2 x 11), each made of 15 facial images of men or women scoring highest or lowest on the respective trait. The primary set of pictures consisted of 138 female and 80 male images. The composite pictures were then presented to 39 female and 33 male raters (aged 19 — 40 y, M = 22.6, SD = 3.6) who judged them on a 10-point scale for each congruent trait (e.g. low- and high-dominance composites were judged for dominance, low- and high-warmth composites were judged for warmth etc.). Out of 11 personality traits (9 primary factors + secondary factors Extraversion and Anxiety), taken from Cattell's 16 PF questionnaire, the raters correctly perceived personality differences between composites high and low on eight traits in males: Warmth ($t_{72} = 5.13, p < 0.001$), Emotional Stability ($t_{72} = 2.22, p = 0.03$), Dominance ($t_{72} = 2.38, p = 0.02$), Liveliness ($t_{72} = 10.38, p < 0.001$), Rule-Conscientiousness ($t_{72} = 2.06, p = 0.04$), Social Boldness ($t_{72} = 2.46, p = 0.02$), Abstractedness ($t_{72} = 3.54, p < 0.001$) and Extraversion ($t_{72} = 7.00, p < 0.001$) and two traits in females: Liveliness ($t_{72} = 2.70, p = 0.01$) and Abstractedness ($t_{72} = 3.29, p < 0.001$). Surprisingly, Dominance ($t_{72} = -3.81, p < 0.001$) and Reasoning ($t_{72} = -3.48, p < 0.001$) in females were judged erroneously, i.e. low composites were judged significantly higher on the specific trait than high composites. Similarly as

in previous studies, male personality was judged more accurately than females' and females were better than males in personality judgments. More specifically, females judged Abstractedness and Liveliness in both sexes and further Warmth, Dominance, Social Boldness and Extraversion in males correctly. However, at the same time, female raters in contrast to male raters attributed Reasoning and Dominance to female composites incorrectly. Males judged Abstractedness in women and Warmth, Liveliness, Rule-Conscientiousness and Extraversion in men correctly. The results provide an additional evidence that personality can be judged accurately merely on the basis of facial appearance. Moreover, Cattell's 16 PF questionnaire proved to be a suitable tool for assessing targets' personalities. Such ability could be hardly explained by trial-error learning alone and thus points to evolutionary importance of correct estimation of other people's personality. The sexual differences found further imply higher evolutionary significance of this ability for women, probably mainly related to mate choice.

Nonverbal behavior 1

How the body moves an audience. Personality in speeches

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Nonverbal signals play a predominant role in human communication. Thus, politicians and other leaders, who try to win the approval of a vigilant audience, are not only judged by the content of the speeches they present, but also how they perform on a behavioural level. The affective content, that nonverbal signals convey, influences how information is processed by the human brain and the emotional state of the signal's receiver is manipulated in favour of the sender. Because nonverbal behaviour depends on personality, it can be concluded that individuals differ in their ability to communicate their aims successfully on the nonverbal level. This is an explorative study. It aims to show, that there is a relationship between body movements and personality. Traditional approaches try to analyze behaviour by splitting the behavioural stream into discrete and homogenous categories. In contrast to that, we focused on the investigation of another dimension of nonverbal communication, namely the quality of movements. The performances of politicians during a public speech were converted into animated stick-figures. In a rating experiment subjects judged these stick-figure movies on scales measuring the big-five personality factors. The coordinates of the major joints, that had been stored during the encoding process of the movies, contain the information to measure the quality of motion. By subtracting the coordinates of the joints from the coordinates in a previous frame it is possible to determine how much variation occurs between two points in time. Computer algorithms were used to filter maximum and minimum amplitude, speed, duration and complexity of the variations and the underlying body movements. These units of measurement were correlated with the data derived from the rating experiment. Statistical analysis revealed that extraversion is communicated via amplitude and the amount of motion. Correlations with the factor agreeableness produced similar, but less pronounced, results. No significant correlations were found for the other personality factors. Although it is not one of the main aims of this project, data were analysed for sex differences, too. Significant differences were found concerning the amount of motion, and the amplitude of body movements. In both

cases male politicians tend to produce higher values. The present state of statistical analysis suggests that extraversion and agreeableness are communicated via certain qualities of motion. This is in accordance with previous studies in this field. It is not very surprising, that extraversion and agreeableness can be decoded from overt behaviour, since these personality traits communicate qualities which facilitate the establishment of an interaction. This does not mean that the other dimensions of the five-factor model do not play a role in relationships, but they may be of minor importance at the beginning of an interaction. For this reason they may be communicated by more subtle signals. Additional analyses, which have yet to be conducted, may detect such signals. Acknowledgements: This study was funded by International Society of Human Ethology (Owen Aldis Award 2006)

Using the human affect ethogram to compare the Gottman and Ekman models of emotion

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Many researchers have attempted to scientifically define and describe both human emotions and the cues thereof, and systems have been developed to objectively record and analyze the various types of affect. The Facial Action Coding System (FACS) is a precise tool which records every discrete facial movement that occurs during the window of observation. Due to the level of detail entailed, the FACS requires hours of analysis for a few minutes of video. This can often be an impractical option when there is a large quantity of data to be analyzed. The Specific Affect Coding System (SPAFF) uses the “facial action units” (AUs) of the FACS in its analytic structure, but has several advantages over its predecessor. The SPAFF was designed for use as a clinical tool, and is therefore applied in real time. Also, the SPAFF is sensitive not only to just AUs, but also certain gross and fine motor movements of the rest of the body (physical cues). The subject’s speech is also used in SPAFF analysis, both in terms of its non-verbal qualities such as tone and tempo (vocal non-verbal indicators), as well as the actual content (verbal indicators). The well-defined emotions (15 in all) described by the SPAFF, as well as its robust variety of behavioral cues led us to strongly consider its possible application to our research. However, there were two aspects of the system which limited its utility both related to its practical application. First, SPAFF analysis is conducted at the “molar” as opposed to the “molecular” level: all that is recorded is the actual affect codes, and not their constituent elements. Its designed use as a clinical tool makes it less useful as a tool for rigorous data analysis. Second, the SPAFF is designed to analyze dyadic (two-person) interactions, and so many of the verbal indicators are not applicable to certain laboratory situations. A novel approach was needed that would fulfill the following three conditions: (1) Real-time coding, (2) Molecular level of analysis, and (3) Non-dyadic. We began to design a system, based on the indicators (and affect code structure) of the SPAFF. Many of the dyadic verbal indicators were either eliminated or modified for use in our context, and some new behaviors were added. After several iterations of revision, 103 codes were selected for inclusion in our final product. In order to be used in real time, while still coding at the molecular level, we decided to use one-zero focal animal sampling, which is an ethological “time-sampling” method. This method of data collection was perfect given the context of our study. Undergraduate

research participants responded to several questions designed to simulate what might be asked by an online “video dating” service, and their responses were recorded on digital video. Thus, we collected 11 equal (45-second) samples, one for each question. Our new system, the Human Affect Ethogram, was used by three independent raters to analyze 105 videos collected over a six-month period. The Classical Theory (CT) inter-rater reliability among individual behavioral items was .90, indicating excellent reliability for the items themselves. Two different systems for aggregating behavioral items into common factors were used. The first system was based on the indicators listed for the original Gottman & Krokoff (1989) SPAFF and the second was an extension of the factors identified by Ekman’s (2004) theory, as applied to the SPAFF in addition to the FACS items. The original models were empirically respecified based upon item-factor correlations and then compared and contrasted. For the 15-factor SPAFF-based model, the CT reliability was .94; for individual differences in factor scores (the subject*factor interaction), however, GT coefficients were .00 across items within factors and .00 across raters, indicating virtually no generalizability of the individual differences in emotional expression. For the 7-factor Ekman-based model, on the other hand, the CT reliability was .88; for individual differences in factor scores (the subject*factor interaction), GT coefficients were .45 across items within factors and .99 across raters, indicating better generalizability of the individual differences in emotional expression. We therefore concluded that the Ekman-based model was superior to the SPAFF-based model in describing the covariation among behavioral indicators of emotion within individuals, even when extended to a quantitative ethogram composed of an augmented list of items derived from the SPAFF. As applied to individual differences, the factors described in Ekman’s (2004) model provided a better taxonomy for organizing the SPAFF items than the Gottman & Krokoff (1989) SPAFF model itself and produced a greater degree of agreement among independent raters.

Mock aggression behavior in adolescents: An observational study

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Mock aggression resembles serious aggression structurally, but lacks intent to harm, being friendly or playful. Mock aggression, contrary to true aggression, is typically accompanied by positive emotions, and almost always has positive outcomes (Ballard, 1998; Ballard et al., 2003). Mock aggression occurs in many species, and includes behaviours such as play-fighting, tickling, chasing, wrestling and biting. Physical mock aggression occurs mainly in children and adolescents, whereas a verbal form of mock aggression is more common in adults. Although its high frequency and importance in social interactions, this behaviour has been little investigated. With a hidden camera located in a high position we recorded social interactions in adolescents while exiting from a secondary school, and waiting for the buses. Mock aggression behaviours were recorded in 95 adolescent groups. Total number of mock aggression behaviours examined was 117. The results showed that this behaviour occurred mostly in all male groups (53.6%), and seldom in all female groups (5.25%). In mixed groups mock aggression occurred mainly in courtship contexts. Agents of mock aggression behaviours were males in the 79% of cases, and also the targets were males in the 77% of cases. When the target was a female, mock aggression was often used by males, in the first courtship stages, to reach intimacy and body touch. The most frequent

behaviours were: hitting the an arm (15.5%), pushing with the hands (13.8%), kicking (11%), tickling (9.6%), pretend fighting (8.2%). Mock behaviours are usually quite shorts in duration (mean: 2.5-3 seconds). In a proxemic perspective mock aggression behaviours usually had as outcome a reduction of interpersonal distances and the emergence of affiliative behaviours.

Cheek to cheek: Observation of interactions among toddlers

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Theoretic background. Inside the wide field of the studies on the development of language and the early social skills, toddlers are observed especially when they interact with adults like mother, or other caregivers (Ashley et al 1997, Trevarthen 2006, Camaioni et al 2003). Recent studies (Selby & Bradley 2003, Malloch 2000, Malloch et al. 2005) underline that toddlers are able to be involved with two and three partners at the same time. In particular the Malloch's research was carried out with 12 infants of 9 months old divided in four groups and observed in laboratory. The results underlined there were not significant gender differences in the number of vocalisations and/or movements of body. Despite of these studies there are still few researches about the observation of toddlers' interactions in settings different from the laboratory. Aim. The aim of this study is to observe and describe the use of the voice and of the body during interactions among peers, without the presence of adult. Unlike the previous researches we would analyse: a) toddlers in a naturalistic setting as the nursery school, b) groups of five elements instead of three, and c) children free to move inside the room. Method. The observation was carried out in a nursery school of Bologna (Italy) with 11 young children of 14 month-old. Children were divided in two groups. Each group was observed one time a week for four weeks. We observed young children during free play in a room familiar to them. To warrant the well-being of children a reference caregiver was invited to take part at all the sessions; we asked to caregivers to limit their presence only to conflict and dangerous situations. All sessions were video and audio recorded. A daily dairy was compiled by the observer who was always present in the room. Results. All data collected were analyzed firstly observing the use of the body, of the glance, and of the gesture during interactions among toddlers, and then we focused on the individual characteristics of the voice: intensity, pitch, rhythm, to find out also some possible gender differences. We defined two evident variables (linked to each other) on the different use of the voice: the age of the children and their level of motory skills. Conclusions. The results underlines voice is as "instrument" of interaction like the body and the gesture. In particular the data show how the different use of the voice influences the interaction's style of each toddler, for example on the choice of the partner, the way to start/interrupt the "dialogue", and the content of the interaction. Observing very young children in a naturalistic setting, as the nursery school where children spend a large part of the day, allow us to observe the "micro" relations inside the groups, the use of known space and toys.

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Attractiveness and Mating 2

5

Mate choice in adolescence: What do they want?

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Investigating universal human behavioral patterns is one of the principles of Evolutionary Psychology and innumerable studies have examined the universal reproductive patterns of our species. To understand the process of choosing romantic and/or sexual mates, many researchers have conducted studies to assess preferences for certain traits in potential mates. In general, the studies use instruments with characteristics previously determined by the researchers, in addition to concentrating the sample into a single age group, the young adults, especially psychology undergraduates. However, studies on mate choice during adolescence are of great importance in understanding the onset of sexual behavior. For this reason, our aim was to investigate characteristics considered important by adolescents during the process of choosing a romantic mate, with a focus on the language used to construct the available instruments and which reliably express their preferences. Our sample comprised 467 Brazilian students, 309 girls (age mean = 15.71 ± 1.01 years) and 158 boys (age mean = 15.87 ± 1.87 years), with age ranging from 12 to 19 years. All the non-remunerated student volunteers took part in the study at two learning institutions and at a public science fair promoted by the Universidade Federal do Rio Grande do Norte. All ethical norms were followed, according to National Health Council resolutions. The study was divided into two stages: (1) collecting the characteristics deemed important and (2) categorizing and assessing the importance of the characteristics collected. In the first stage, 164 students responded to an open questionnaire, providing “physical characteristics”, “behavioral and personality characteristics” and other characteristics, all in relation to the ideal mate for a romantic relationship. In this questionnaire, the adolescents supplied for each category up to five traits that they considered important when choosing romantic mates. The questionnaires were filled out individually. We obtained 2247 responses; the most widely cited was behavioral characteristics, followed by physical and other characteristics. We found statistically significant differences in the response frequencies of the different categories. In the second stage, 303 students responded to a five-point Likert scale. This scale contained 60 items, resulting from the categorization of the responses provided

in the previous stage. Each category (physical, behavioral and other characteristics) contained 20 items. The scale was filled out individually. To analyze the scale, we used factorial analysis, with the Varimax Rotation Method and considered an eigenvalue limit higher than or equal to one to form the factors. We performed a separate analysis of the three categories. We checked sample adequacy using the Kaiser-Meyer-Olkin Sampling Measure for the three categories and found a high degree of reliability for physical characteristics (KMO = 0.746), behavioral characteristics (KMO = 0.822) and other characteristics (KMO = 0.739). Physical characteristic assessment yielded six factors, explaining 56.18% of the total variance in interdependence of response; for behavioral characteristics, other six factors were formed, accounting for 58.87% of total variance; and the other characteristics led to the formation of five factors, explaining 55.68% of the total variance. In this stage we reduced 60 characteristics to 17 factors, with an eigenvalue higher than 1: (a) physical characteristics, factor 1 (the woman's body), factor 2 (the man's body), factor 3 (peripheral traits), factor 4 (face), factor 5 (weight) and factor 6 (genitalia); (b) behavioral characteristics, factor 1 (friendship/kindness), factor 2 (good humor), factor 3 (fidelity/sincerity), factor 4 (good manners), factor 5 (selectivity) and factor 6 (jealousy); and (c) other characteristics, factor 1 (healthy habits), factor 2 (similar activities), factor 3 (style/sensuality), factor 4 (social habits) and factor 5 (other habits). In our initial survey, we determined dozens of characteristics cited by the adolescents as being important during the choice of a romantic mate. Quantification showed a special interest for behavioral characteristics, followed by the physical characteristics of potential mates. This pattern suggests higher concern with the quality of the relationship than with physical appearance, as has been found in adults in cross-cultural studies. The factorial analysis values in the second stage confirm that behavioral characteristics are more important than physical and other characteristics. These results show that, despite the variety of traits initially reported by the adolescents, a lower number of characteristics can be extracted to explain the universal dimensions of mate choice, as was observed in studies with adults. In general, the factors represent groups of individual characteristics or characteristics related to interpersonal behavior, suggesting an insistence on quality in both the mate and the ideal relationship.

Romantic love. A probable universal and possible honest signal

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In sociology, cultural anthropology, history, philosophy and other disciplines an influential topos holds that romantic love has first developed in the European Middle Ages and Renaissance and later became part of a Bourgeois set of behaviours (cp. Foucault 1976, Aries & Bejin 1982). The "romantic love code" is seen to be a correlate of the separation of the public and the private (or of the transition between collectivism and individualism, e.g. Dion & Dion 1996) and this separation is thought to have happened in particular social and historic conditions only. Most works of cultural anthropology, even those centering on sexuality, make the same claim (e.g. Malinowski 1929). However, there are some exceptions. Marshall, who described the people of the Polynesian island of Mangaia as obsessed with sex but unaware of romantic feelings, was contradicted by Harris, who did a careful ethnography (1995) of the same ethnic group. Bell-Krannhals (1990) and myself (2001) have challenged Malinowski's claim that "... all customs, arrangements, and codes

of behavior dictate simple, direct approaches (to having sex, my addition)...“ and Kohl (2001), a German anthropologist, has discussed the indeed surprising fact that the dogma of missing romantic love has remained widely unchallenged so far. Donald Brown does not mention romantic love in his book on human universals (1991), but is sure that it is part of the *conditio humana* (pers. comm.). Using the Human Relations Area Files, Jankowiak and Fischer (1995) have shown that romantic love is found in 148 of 160 societies and Fisher (2004, 2005) as well as Esch & Stefano (2005) and other authors describe, in great detail, the cascades of neurochemical events which not only trigger sexual desire, but also the bewildering state of being romantically bonded. That romantic love is claimed to occur only in a late stage of human history is the more surprising as one finds, in literature, age-old examples of this, e.g. the “shir ha shirim“ of the Old Testament, a great love song and very convincing testimony of romantic feelings. I will also present a famous poem of Walther von der Vogelweide, a medieval German writer, arguing that it is unlikely that people in the centuries and millenia before this period did not have similarly erotic and romantic perceptions, feelings and behaviours. A love song from the Eipo in Highland West-New Guinea will serve to prove my claim that romantic love is, indeed, a true human universal. It seems possible that it evolved as an honest signal, rather difficult to fake, which would have served as a mechanism of biopsychologically driven partner selection and, most likely, facilitated female more than male choice.

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Ethological evidence to show that nightclubs are human display grounds

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Young, sexually mature humans commonly congregate into particular but arbitrary physical locations and dance. These may be areas of traditional use, such as nightclubs and dance halls or areas that are temporarily commissioned for the same purpose, such as those used during music festivals and house parties etc. As these dancing behaviours are similar to courtship displays seen in many other species, ethological studies were conducted within a commercial nightclub environment in order to determine whether these displays are used differentially by either sex to attract members of the opposite sex to them. In the nightclubs under study more than 80% of people entered without a partner and so were potentially sexually available and within these nightclubs more than 80% of bouts of mixed sex dancing were initiated by a male approaching a female. These findings therefore show that males are stimulated to approach females rather than the other way round and that females are, in consequence, placed in competition with each other to attract these approaches. The initial studies concentrated on analysis of physical displays (clothing and dancing) to determine the effects of these on male approaches, whilst further studies examined what male characteristics were associated with acceptance or rejection of those approaches. Variations in natural beauty and the enhancement of these characteristics by make-up etc were not recorded in the present studies as these were either difficult to quantify/prone to subjective assessment or could not be reliably assessed from a distance. With regard to clothing, flesh exposure was found to be an important variable and females showing very little skin attracted very few male approaches. Sexually suggestive (upright copulation mimicking) dancing was also found to be important, as females that displayed this behaviour attracted nearly three times as many male approaches compared to females that didn't. Analysis of the combined effect of clothing and dancing displays revealed that whilst only 20% of females observed in this study wore clothing that showed more than 40% flesh/50% breast area and danced in a sexually suggestive manner, they attracted nearly half (49%) of all male approaches seen, indicating that these were the optimum display combinations. With regard to the characteristics of males approaching to females, relative height was found to be an important variable and males were most likely to be accepted where they were not shorter and no more than a full head taller than the female they were approaching. Having a medium or athletic (rather than thin or fat) build also increased males chances of success under these circumstances. Together these findings demonstrate that in a nightclub situation males are stimulated to approach females, that females use clothing and dancing displays as part of their strategy to increase the probability of being approached and that once having attracted a male to them, females use the rapid assessment of relative height and build as part of their decision making

about whether to accept or reject that approach. In all instances where this was measured there was a roughly 50% increase in the number of couples seen leaving the nightclub as compared to those seen entering it.

Mate selection and outcomes in a real world sample

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I will present data from people actually searching for a mate in a dating service (N=12400) and I will outline sex, age and social status differences in mate preferences between male and females. The theoretical approach is based on evolutionary psychological constraints in mate-selection and the underlying cognitive mechanisms. The result indicate that although there is a basic differences in orientation to sexuality between male and females - this gap broadens in the age groups of post menopausal women ("grand-mother-syndrome"). Other mate selection criteria are not affected by age. This differences are stable over time when data from before 1995 and from today are compared. In addition we will compare actual search preferences and outcomes of searches from N=1000 married pairs from the same sample. The general conclusion is that adaptations from our evolutionary past are still working and not out ruled by changes in modern society and changes in economic and medical conditions.

Attractiveness and Mating 3

6

The salience of different sensorial modalities in women and men: Is face more important than voice in mate choice?

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Among the features that receive the highest attention when judging physical attractiveness, the face and the voice are one the most meaningful signals (Rhodes 2006; Feinberg, in press). Earlier research supports the claim that, for both sexes, the face and the voice provides similar information regarding mate value (Collins and Missing 2003; Feinberg, Jones et al. 2005; Saxton 2006). Our study set out to test this claim. Furthermore, based on the assumption that in a typical social situation the face and the voice are perceived simultaneously, we investigated which of the ratings of the two stimuli presented separately is a better predictor of the ratings of the simultaneous presentation. We also hypothesized that beauty and attractiveness measure different dimensions of mate value, which will result in small to medium correlations. We used recordings of spoken vowels and frontal neutral expression face photographs from 35 participants (from Bucharest, Romania, 16 women). The stimuli were presented to 109 participants (university students in Innsbruck, Austria, 84 women) for evaluation in a serial setting: the presentation of stimuli (to get them acquainted with the stimuli), followed by the rating of faces, the rating of voices and finally the rating of faces and voices presented together. The participants used a 5 point scale to rate the stimuli for beauty and attractiveness. We computed the averages for each stimulus ratings and used them to test the hypothesised correlations. In our sample, the face and the voice ratings proved different for both beauty and attractiveness. This pattern was identified in the analysis of the whole sample (beauty ratings: $r=-0.13$, $p=0.45$; attractiveness ratings: $r=-0.15$, $p=0.38$), as well as for separate analyses of men ratings of women stimuli (beauty ratings: $r=-0.07$, $p=0.79$, attractiveness ratings: $r=-0.12$, $p=0.65$) and women ratings of men stimuli (beauty ratings: $r=-0.18$, $p=0.45$, attractiveness ratings: $r=-0.23$, $p=0.34$). Contrary to previous research, our results indicate that the two signals actually might provide different types of information regarding mate value.

Recent work (Lander 2008) found also no link between voice and face attractiveness as presented in static images, but found correlations between attractiveness ratings of voice and moving faces. When men rated women, the beauty ratings of the simultaneous presentation were predicted only by the ratings of faces ($r=0.5$, $p=0.04$). When women rated men, the opposite pattern was found for both attractiveness and beauty: only the ratings of voices predicted the ratings of the two stimuli presented together (beauty ratings: $r=0.57$, $p=0.009$; attractiveness ratings: $r=0.67$, $p=0.01$). It seems that for men, the face matters more than the voice in judging women beauty, while for women it is the voice that matters more when judging men beauty and attractiveness. Whether this is an adaptation relevant to mate choice (face could be an honest signal for women and voice for men) or this is a side effect of the perception systems of the two sexes, remains to be addressed in following studies. The beauty and attractiveness ratings are poorly correlated ($r = 0.28$, $p < .001$), supporting our claim that they measure different aspects of mate value. Based on this finding we can say that future research needs to address also beauty as a possible important dimension, relevant to mate choice and other important evolutionary relevant decisions.

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The look of love: Husbands' and wives' judgments of physical attractiveness

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The accepted view in psychology is that accurate self-assessment leads to adaptive functioning (e.g., Jahoda, 1958). Nonetheless, recent research (Brewer, Archer and Manning, 2007) suggests that single women may systematically over-rate their own physical attractiveness when compared with the ratings of others, including other females and potential heterosexual romantic partners. This study compares the mutual assessments of attractiveness of American men and women (400

couples) who have been married to each other an average of 15 years. It was hypothesized that these couples would illustrate positive assortative mating, being matched in both self-assessment and spousal assessment of physical attractiveness (all comparisons yielded significant correlations at $p < .01$). Mean score comparisons, however, indicate that husbands see their wives as significantly more attractive than the wives see themselves; similarly, wives regard their husbands as significantly more attractive than the husbands see themselves (all comparisons significant at $p < .01$). One potential explanation for the contradiction between these results and those of Brewer, et al. may be that, while younger single women over-rate their own physical attractiveness, ultimately, as husbands and wives age, they may see themselves as less attractive.

Cads and dads in Russia

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The idea of that research is based on the article of Daniel J. Kruger, M. Fisher and I. Jobling article "Proper And Dark Heroes As Dads And Cads. Alternative Mating Strategies In British Romantic Literature" published in "Human Nature vol#14/3". Recent research on human sexuality suggests that humans evolved to choose between short-term and long-term mating strategies, or cad and dad, mating strategies. The Cads show evidence of dominance traits, such as aggressive gaze, unsmiling countenance, freedom and ease of bodily movements, and a threatening self-confidence. As we would expect of men with these dominance traits, they are usually leaders. Cads have a tendency to libertinage, rarely marry, but have sexual affairs with a lot of women. So the second type (Dads) is nonviolent and low in dominance traits. Dads don't possess the commanding and striking presence and are rarely the center of attention in a group. And as distinct from Dads they are monogamous. So, we have chosen two types of Heroes with two different personality traits. Within the framework of research we examined differences in perception of these 2 mating strategies in Russia. The research was carried out in spring, 2007. Sample was 181 females and 122 males' respondents from the different regions of Russian Federation. Respondents filled up the anonymous form. In this form we offered respondents 18 thesis and ask them to answer if they agree or disagree and rate it in 10-points scale. The participants were divided according to following parameters: age (3 groups: less than 24 24-35 more 35); desirable number of children (3 groups: No/1-2/ more than 2); fidelity (Do not have adultery/ Have adultery/ Have romantic relationship with two or more partners at the same time); growth or family oriented; similarity to characters to CadDad. The results of our research confirmed their theory and was able to do some conclusions. The main conclusions are: — Man and woman clearly able to discriminate the differences between the Cads and the Dads and the differences in mating strategies of these two; — The Dads' strategy with high level of paternal investment is more socially desirable. At the same time, the Cads' strategy has more chances to achieve sexual success and have sexual intercourse with a larger number of women in lifetime perspective; — Men's perception of Cads is more positive than women do. These findings confirm the hypothesis that men are more oriented towards sexual variety. On the other hand women rate "brightness" of the Dads higher than men and it substantiates this thesis. — Our data confirmed the hypothesis that career-oriented women

are less interested in paternal investment compared to family-oriented women. Under such circumstances, the Cads would be more successful among career-oriented women.

Your picture tells me what you want: Photograph properties of online dating service users

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Personal advertisements are one technique that is used to advertise oneself to potential mates. Previously, researchers have documented the differences in characteristics that women and men offer compared to those they seek. For example, women offer attractiveness and seek older mates while men offer resources and seek young, attractive mates. However, given that these prior studies were performed using textual newspaper advertisements, there was minimal opportunity to explore visual cues. Contemporary online dating services permit, or sometimes require, individuals to accompany textual advertisements with photographs of themselves. Additionally, advertisements are typically grouped according to the type of relationship that one seeks. For example, lavalife permits individuals to specify their desired relationship as intimate, casual, or long-term, which then determines the type of information that is collected and posted. Mate seekers can search the advertisements according to the desired age, sex, geographic location, and relationship type for potential partners. Searches return a list of individuals, with a small photograph, brief description, and information summary. The viewer can then select a specific advertisement to obtain additional detail or view higher resolution, and sometimes additional, photographs, depending on the searcher's subscription level. In this study we explored, using sexual selection theory (e.g., Buss & Schmitt, 1993) how lavalife subscribers photographically represent themselves to the opposite sex, depending on their sex and the duration of the relationship they seek. We examined only the initial photograph, under the assumption that advertisers will select their preferred and most representative image in order to attract potential mates. We collected 600 images from lavalife, Canada's oldest online dating service. Using the available search criteria, we examined heterosexual Canadian advertisers between the ages of 25 and 34. We collected the first 100 pictures returned for each of the six conditions (female or male, for each of the three relationship durations) and documented the context of the individual in each photograph including: objects that appear in the picture (e.g., alcohol, automobiles, other people) and the setting (e.g., indoor, outdoor). We also coded visual factors about the individuals including: jewelry, visible tattoos or piercings, percentage of visible skin, level of cosmetic use (e.g., heavy, moderate, undetectable), visibility of cleavage (for women), obvious muscular display (e.g., flexing), clothing style (e.g., classy, sports, lingerie), facial expressions (e.g., smiling, serious) and posed position (e.g., standing, sitting, laying). In addition we recorded self-reported supplementary demographic data such as education and annual income. We found that women's display of skin is inversely proportional to the length of relationship they seek. Men's photographs more frequently contained displays of resources (e.g., an automobile) than did women's. Those seeking a long-term relationship smiled more often than those seeking an intimate relationship, presumably in an effort to display positive

personality characteristics rather than appear sexy or mysterious. We will present these key findings, as well as others, with reference to sex differences in mate preferences by relationship type.

Nonverbal Behavior 2

The evolution of smiling: an old story revisited

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Smiling has been shown to have deep roots in the primate lineage. Behavioural studies as well as anatomically based investigations have shown that the silent bared-teeth display (sbt) in non-human primates could be homologous to the human smile. Across the living primates, the sbt is associated with appeasement, affiliation, reconciliation and, to some extent, social play. Interestingly, the wide range of contextual variation appears to be associated with social organisation rather than phylogenetic aspects, pointing to some flexibility in the way different species use the behaviour. It is unclear, however, whether smiling/sbt is generalised to most affiliative situations, or if various forms of the same behaviour are specific to particular contexts. Recent research on humans suggests that various forms of smiling could be specific to certain social situations, indicating that the behaviour extended its functional range through subtle modifications of its form. The existence of different forms of smiles has been largely documented in the psychological literature. In particular, researchers made a distinction between emotion-based smiles (Duchenne smiles) and smiles that can be produced voluntarily (non-Duchenne smiles). Little is known, however, on the function these smiles could have in social relationships. The emancipation of smiling could result from the intricate relations between ecological factors and social organisation. The distribution of resources would influence the power asymmetry between individuals and their patterns of affiliative displays. Environments in which resources can be monopolised easily by individuals would facilitate the development of dominance based relationships because physically strong individuals can coerce competitors into yielding desirable resources. On the other hand, environments in which resources are patchy and hardly controllable by single individuals would facilitate the evolution of strategies based on collective and cooperative exploitation of resources. These two modes of resource exploitation could have led to particular types of social relationships (despotic/hierarchical vs. egalitarian), which could be regulated by different forms of affiliative behaviours. Based on these socio-ecological principles, this paper will provide evidence that, in humans, the Duchenne smile could function to advertise a prosocial strategy based on long-term

cooperative social bonding: e.g. friendship, whereas non-Duchenne smile would be restricted to the regulation of hierarchical and formal relationships. Finally the relevance of emotion-based behaviour to long-term cooperative relationships is discussed in the framework of costly signalling theory, which construes that the reliability of social signals is ensured by a balance between the costs and benefits of producing reliable versus deceptive signals. Ultimately, signals will be reliable when the costs associated with deception exceed the benefits of producing reliable signals.

Laughter on the campaign trail: How 2008 presidential candidates use humor during primary debates

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Humor has long been an important tool for American Presidential candidates while on the campaign trail. Such Presidents as John F. Kennedy, Ronald Reagan, and Bill Clinton have been lauded for their humor; even George W. Bush in the 2004 election used humor to good effect on the campaign trail. The use of humor by candidates has been known to humanize them while endearing them to their constituents. However, while this humor may be self-deprecatory, reducing the chasm between candidate and voter while establishing the candidates' personal qualities, it can also be used as a tool to attack and denigrate opponents both within and outside the candidate's political party. Therefore, this paper will analyze the use of humor by Republican and Democratic Presidential candidates during primary debates of the 2008 electoral season. Data from each political party's first three debates (Democrats: April 26, June 3, June 28; Republicans: May 3, May 15, June 5) has already been collected and coded with additional data from two additional debates which focused on front-running candidates (New Hampshire and Super Tuesday debates) for both political parties having collected and currently undergoing coding (expected $N \sim 300$). Data to be analyzed uses laughter as indicator of a "successful" humorous comment, and will first consider the laughter-eliciting humorous comments themselves and the focus of the jokes in terms of persons and/or issues. Non-verbal behavior immediately preceding and during laughter will be analyzed using coding schemes derived from work done by Roger Masters and Frank Salter and considers facial motions and head, torso, and hand movements. Inter-coder reliability will be addressed through Krippendorff's alpha, with 100% of cases analyzed by both authors. This paper aims to be descriptive in nature, with patterns in humorous comment non-verbal delivery style being the focus of analysis.

Oscillatory dynamics of cortical responses to emotional facial expressions and influences of situational factors

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It is generally known that the sense of pronounced words constitutes just a minor part of the information perceived during communication. Non-verbal signals constitute the major part, and face expressions have the primary significance. It has been shown that perception of face expressions depends a lot on the stable personality differences and individual's states. These are two main sources of the inter-individual variability in reactions to such stimuli. Associated with personality stable individual differences in reactions to some kinds of stimuli have been frequently studied. On the other hand, much less evidence exists concerning the influence of moods, states, and general attitude to the experiment. Some people are generally inclined to interpret the other people facial expressions positively; others – on the contrary – are predisposed to see threat and hostility more often. These individual differences are associated with peculiarities of functioning of some brain regions that evaluate the emotional significance of incoming signals. An investigation of response features at the level of brain structures could give a very important information which could not be obtained by means of self-reports or behavior observation methods. Considerable evidence indicates that different EEG rhythms are associated with different motivational, emotional and cognitive processes. The study of oscillatory dynamics of these rhythms in different cortical regions during presentation of emotional stimuli may help to understand brain mechanisms underlying personality-related individual differences in perception of these stimuli. This study aims to investigate an influence of states and moods during experiment as well as attitude to experiment and experimental stimuli on oscillatory dynamics of cortical responses during presentation of emotional facial expressions. Data were obtained in 40 healthy volunteers (19 men and 21 women) aged from 17 to 32 years ($M = 21.3$, $SD = 3.8$). None had neurological or psychiatric deficits. EEG was recorded in resting state conditions (12 min alternating with eyes opened and eyes closed) and during presentation of emotional facial expressions. Subjects were instructed to evaluate emotional expression of each presented face using analog scale ranging from -100 (very hostile) to 100 (very friendly). The number of face stimulations was 120 for each subject, including 40 faces of each category: angry, happy and neutral. Pictures of emotional faces were selected from the collection of photographs by Ekman and Friesen. We selected 30 photographs, particularly, 5 different females and 5 different males with 3 different facial expressions. The pictures were presented in black and white (17 x 17 cm) and displayed on a screen at a distance of 120 cm from the subjects. Just after the experiment subjects completed a questionnaire which was designed to evaluate mood, general arousal, the level of interest, and attitude to presented pictures. The subjects also completed a set of personality questionnaires. Time-frequency decomposition of EEG data was performed using wavelet transform and event-related spectral perturbations (ERSP) during presentation of faces were calculated. Factor analysis of the questionnaire items showed that all of them loaded on one factor. Hence, one scale was created which measured a degree of interest and positive emotions during the experiment. This scale scores correlated negatively with Buss-Perry anger ($r = -0.39$, $p = 0.018$), Spielberger trait anxiety ($r = -0.36$, $p = 0.033$) and Eysenck unhappiness ($r = -0.37$, $p = 0.026$). In comparison with high scorers, low scores on this scale showed significantly higher theta and lower alpha power in resting condition. Analysis of ERSF showed that delta overall synchronization and theta synchronization in frontal and central regions as well as desynchronization in alpha frequency band in central and posterior cortical zones were significantly less pronounced in low than in high scorers on the attitude scale. The data are discussed in terms of higher or lower involvement of subjects in the experimental task and its association with personality traits and pre-task state.

Car fronts as (human) faces: Overperception errors as evolutionary stable strategy?

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Face detection and the accurate interpretation of an agent's biological state and intentions at an early stage of the encounter must have been crucial for the survival of our ancestors. A selective sensitivity to relevant features and configurations likely presented an adaptive advantage. Increasing sensitivity over evolutionary time might result in contemporary mechanisms for face processing that are not only activated by faces, but also by abstract representations (c.f. emoticons). We go further and propose that they generalize even to non-face objects such as cars. The evolution of such a bias in perception cannot only be explained as the (not disturbing and therefore carried-along) by-product of an evolved psychological mechanism, but also in terms of error management theory (EMT). A simplistic situation: misinterpreting the lump in front of us as a stone when it is a bear could be lethal, whereas the opposite mistake will not cause harm. Such differences in costs of errors might have led to the persistence of the bias and to humans interpreting even inanimate structures in social terms. We hypothesized that people consistently attribute human characteristics to car fronts. We further predicted a significant covariation of shape and trait attribution. This covariation is expected to reflect signals known in human face-to-face interactions (e.g. proportional arrangements reminding of Kindchenschema, angled headlights communicating anger as does a frown, etc.). On a higher cognitive level of awareness, people should report associating a face and be able to localize facial features in cars (e.g. the headlights as eyes). To overcome the lack of empirical testing on this topic, a Geometric Morphometrics was combined with a rating study and classical multivariate statistics. Twenty male and twenty female Austrian young adults (19 to 33 years) participated in the study. They were asked to give their impression of thirty-eight car fronts on eighteen continuous scales of human characteristics (including maturity, masculinity-femininity, personality traits, emotions and interpersonal attitudes). Thereafter, they saw all cars again and answered questions on the association of faces. The stimuli were standardized pictures of Digital Mockups (models of 26 brands from 2004 to 2006) sharing the same material properties. All cars were colored silver. Geometric Morphometrics is a landmark-based approach for the quantification of shape (and form = size + shape). Instead of measuring distances and angles, homologous points are digitized and their two- or three-dimensional Cartesian coordinates serve as the (dependant) variables. This way, the spatial relationships of features remain in the statistical analyses and the results can be plotted again as forms. More specifically, we can extract and visualize the characteristic shape of a car front and its constituent parts that corresponds to a specific trait attribution. This allows for comparison with the current literature on human facial forms and expressions. Analyses of inter-rater agreement demonstrated that thirteen of eighteen characteristics were reliably communicated by car fronts. A principal component analysis of these revealed a single dimension explaining more than eighty percent of trait variation. This principle component (entitled "power") mainly consisted of maturity, dominance, arrogance, anger, hostility and

masculinity. The second principle component (PC 2) “sociability” explained nearly ten percent of total variance with high loadings of contentedness and happiness. Shape regression revealed a smaller windshield relative to the car body and a shift to more angled headlights with increasing “power” ($p= 0.001$), whereas increasing “sociability” was mainly associated with an upward shift of the endpoints of the additional air intake and an upward-shift of the lateral-most points of the car front ($p= 0.185$). In the final questionnaire, the majority people reported associating faces with most of the cars and marked facial features on the car fronts. The changes of proportions along the first PC resemble facial growth allometry – from a cute child with a large forehead to an adult male with a large chin. The relatively angled, slit-like headlights might parallel an angry frown and dominant brow ridges. The air-intake with upward shifted ends could be interpreted as a smile which would explain attributions of happiness and contentedness. Also, the results of the additional questionnaire support the assumption that car fronts today might address evolutionary response mechanisms originally designed for the perception of faces, which can be explained with regard to a “better safe than sorry;” strategy. Our follow-up studies on the cross-culturality of the phenomenon and different perception levels, such as gaze direction, as well as possible implications for urban life such as driving and pedestrian behavior will be discussed. Acknowledgements: This work was funded by EFS Unternehmensberatung and the EU FP6 Marie Curie Actions grant MRTN-CT-2005-019564 (EVAN).

Symposium: Attachment 1

To Forgive, Divine? Implications of Attachment Theory and neuroscience for a trans-species psychology

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Self-injury, depression, Post-Traumatic Stress Disorder (PTSD), intra- and inter-species hyper-aggression and killing, infant neglect, infanticide and other behavioral anomalies have been identified in elephants under conditions of severe human-induced stress: mass killings, social breakdown, translocations, and habitat loss. Particularly susceptible are infant elephants who are orphaned when they are captured or witness their families slaughtered. Notably, in the case where trauma recovery intervention occurs, there is an absence of psychological disorders by the time they reach adolescence and adulthood. When restorative contexts emulating elephant cultural values and developmental processes are provided, prosocial behaviors associated with forgiving behaviour develop. Here, we describe elephant forgiveness—described as a specific set of prosocial behaviours that persist even after a perceived transgression of self—as a vehicle to explore the foundations of an elephant psychology. Elephant psychology is an example of trans-species psychology, the psychological complement of trans-species models of brain and behaviour that have recently emerged from neuroscience. Thus, we are able to examine elephant trauma recovery from a state of knowing—shared neuropsychology and developmental processes of attachment—to what appears more tentative—subjective response to traumatic experience expressed as forgiveness and the repair of the self. Trans-species psychobiological models of attachment provide a mechanistic basis for understanding the development of the self as a general process, but one whose particular psychological, affective, and behavioral expressions evolve through species and individual-specific contexts. We draw from an interdisciplinary approach that integrates cross-cultural models of development, neuropsychology, and ethology with illustrations from case studies. Analysis results suggest that forgiving (and simultaneous absence of revenge-seeking) behaviour is related to normative processes of self development and social contexts in elephant culture. Elephant forgiveness is consistent with social patterns associated with cultural ontogenies

that are oriented toward interdependence and collectivity. Further, consideration of elephant self-development indicates that aberrant behaviours regularly observed in ex situ elephants and cull orphans (e.g., inter-species killing, intra-specific aggression, infant neglect) is related to relational trauma as well as the absence of restorative social contexts and positive attachment figures. In cases when trauma has been sustained, but appropriate mechanisms and structures are made available in recovery, the infant elephant lacks symptoms indicative of attachment compromise. Taken in sum, these results compel a broader, “ethologized” trans-species conceptualization of psyche for the study of both humans and other species. Through the window of psychobiology, we are given a glimpse into mental experiences of another species, and in so doing, also achieve new insights into our own psyches.

Early mismatch, later maladaptation in children

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“Open programmes”, bring advantages of flexibility and adaptation to changing environments but they also bring risks, especially when the structures which support learning about the current environment fail to do that. Some failures are obvious, violence to or neglect of offspring, death or absence of parent. Others are less dramatic and are sometimes the side effects of changes which have benefits elsewhere. Many of these come within the ambit of mismatch theory, which argues that cultural evolution has progressively changed the environment in which children grow up, away from that to which we are genetically adapted. The result, it could be argued, is an insidious erosion of human adaptiveness, through a process similar to habitat erosion, where here the habitat is the conditions for the development, through childhood, of adaptive individuals. And yet this argument needs to carry a warning. Much of the work in this area is done by clinicians or is influenced by clinical ideas, thus evaluative concepts come to be used (e.g. condition C or event E is bad for individual P), rather than sticking with the descriptive concepts of scientific ethology. This has sometimes skewed research. For instance, the effects of early “difficult” temperament were thought to be negative, but this was largely because only those with negative outcomes, the problem cases, were studied. More recent work has shown that if such infants are sensitively reared they tend to be more successful than easy infants. Ethologists, with their attempt to look at the range of behaviour, would not, I hope, have made this initial mistake. What is needed is to try to plot the outcomes of putative “failures” or mismatches in the nurturing environment.

Emerging from long-term deprivation: Bonding and tolerance of social stimulation in ex-laboratory chimpanzees

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Traumatic life events and chronically adverse living conditions lastingly affect chimpanzees' personalities, stimulation thresholds, and social competence. In a retirement project for laboratory chimpanzees following decades of deprivation we developed procedures for therapeutic re-socialisation and monitored their behaviour from prior re-socialisation through group building until one year after onset of rehabilitation. Onset of maternal and social deprivation during infancy differentially affected the functioning of the HPA-axis and compromised both poles of the bonding motive: the attachment complex that regulates care giving and security seeking as well as the complex of social stimulation as expressed by exploration, risk seeking, and play. Early deprived chimpanzees (1.2 years) developed more timid personalities with respect to non-social and social novelty than did later deprived chimpanzees (3.6 years). Deprivation lead to inefficient coping with stress and insecurity, and, in consequence, a vulnerability to renewed experiences of helplessness and overwhelming. Matching chimpanzees with conspecific partners of similar and different deprivation histories during therapeutic resocialisation revealed that, contrary to assessment theory, asymmetric dyads had most difficulties in finding a *modus vivendi*. Dyads symmetric in deprivation history, on the other hand, established social compatibility more quickly. In the longer run, however, recovery was best when less deprived social partners formed bonds of tolerance and affiliation with one another or with severely deprived subjects. These findings suggest that choosing social partners who can attune their behaviour to provide a relationship-dependent optimum of stimulation and modulation of arousal is fundamental to psycho-social health and so deeply engrained that not even profound deprivation can obliterate it completely. Moreover, when primates assess strangers as potential social partners they appear to examine more than each other's competitive potentials. Competition and dominance clearly are not the most important organising principles of primate social relationships, but are partnered by a profound need to bond which is maintained throughout life and is uncovered by traumatic life events, such as isolation, deprivation and loss of situation control.

Symposium: Genetics and Human Ethology

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Genetics and language dispersals: What is the connection?

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Anatomically and behaviorally modern humans originated more than 50,000 years ago, but evolution continued after that time. Genome-wide estimates suggest that recent human adaptive evolution has been exceptionally rapid, involving positive selection on thousands of new mutations. Darwinian selection is fundamentally a demographic phenomenon; a selected allele increases the intrinsic growth rate of its carriers. Advantageous mutations do not occur homogeneously across space, because of local differences in population size, growth rates, and environments. These inhomogeneities, across the large number of selected mutations, create the possibility of nonlinear demographic effects. This study explores the circumstances in which population growth leads to self-organizing growth waves. Under some conditions of density and outbreeding resistance, waves of growth may generate long-distance dispersals and “territorial expansions”. Because these waves are demographic, they have consequences on both neutral genetic elements and non-genetic markers of populations, including language. It is proposed that the widespread dispersals and turnover of language families during the past 18,000 years may result from a series of such waves of population growth in tandem with adaptive evolution.

Recent adaptive evolution in agricultural societies

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Recent work in human genetics, especially whole-genome scans for selection, have discovered a number of ongoing selective sweeps. Many of these sweeps are very recent and appear to be responses to the new selection pressures associated with agriculture. Those changes fall into several categories, and in for some we have a fair understanding of the adaptive function. In particular, we see metabolic changes that are probably a response to the new agriculture diet, a diet that with less protein, fewer vitamins, and a much higher carbohydrate fraction than that of foragers. We see changes in immunological genes that must be a response to the increased incidence of infectious diseases that resulted from higher population density and close association with domesticated animals. There are hints of selection for increased work efficiency, a natural consequence of the transition to a Malthusian economy in which food availability limited population growth. Perhaps the most interesting changes were those affecting personality traits - responses, we think, to the selective pressures in larger, more complex, hierarchical societies. We see changes in neurotransmitter receptors and transporters that seem likely to favor 'tamer' personalities. We also see changes in the frequency of old alleles that apparently implement variant behavioral strategies, as the relative payoff of different strategies changed under agriculture. Altogether, these genetic results suggest we should take a new look at 'self-domestication' hypotheses, in which explicit parallels are drawn between the genetic changes seen in the domestication of wild animals and biological changes in humans in recent millennia.

Assortative mating and life history strategy: A cross-cultural study

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According to reproductive Life History (LH) theory (Charnov, 1993; Ellis, Figueredo, Brumbach, & Schlomer, under revision; Roff, 1992, 2002; Stearns, 1992), fast LH strategies are naturally selected in unstable, unpredictable environments where sources of mortality are predominantly extrinsic, and hence uncontrollable. Such environmental conditions often lead to highly variable population densities, which reinforce this selective effect. In contrast, slow LH strategies are naturally selected in stable, predictable environments where sources of mortality are predominantly intrinsic, and hence controllable by genetically-influenced (and hence evolvable) developmental processes. Such environmental conditions often lead to highly stable population densities, which also reinforce this selective effect. Thus, according to most evolutionary biological theories regarding the origin and function of sexual reproduction, conditions favoring faster LH strategies should also put a selective premium on higher rates of genetic recombination and hence exogamy. In contrast, conditions favoring slower LH strategies should put a selective premium on lower rates of genetic recombination and hence endogamy, to preserve the integrity of locally well-adapted and perhaps co-adapted genomes. It therefore follows that slower LH strategists should exhibit systematically higher assortative mating coefficients on heritable traits than faster LH strategists. To test these theoretical predictions, we used data from an ongoing cross-cultural study on assortative pairing of both friends and lovers (Figueredo, 2007). In this study, independently sampled pairs of opposite-sex romantic partners and pairs of same-sex friends rated both themselves and each other on the following four traits: sensational interests (SIQ-R), mate value (MVI), life history strategy (Mini-K), and delinquency (D-20). This study sampled from three different cultures:

Tucson, Arizona (104 pairs of lovers, 103 pairs of friends), Hermosillo, Sonora (147 pairs of lovers, 113 pairs of friends), San José, Costa Rica (101 pairs of lovers, 122 pairs of friends). Samples of pairs of opposite-sex romantic partners and pairs of same-sex friends were collected in local bars, clubs, coffee houses, and other such public places. Whereas assortative mating has been defined as “sexual choice for traits similar to one’s own” (Miller, 2000), assortative pairing is a more general term denoting the tendency to select friends or lovers who possess traits similar to one’s own (Rushton, 1989). These preferences may be based on the detection of genetic similarity; selecting individuals similar to oneself may result in greater altruism towards partners (whether social or sexual) as well as potential offspring (Rushton, 1989). We therefore included same-sex friends in this analysis based on inclusive fitness theory (Hamilton, 1964), whereby genetic replication can be accomplished indirectly by means of altruism that is preferentially directed towards genetically related or similar individuals as well as directly by personal reproduction. Slow LH strategists should therefore be higher on assortative pairing with social as well as sexual partners. The Mini-K is a 20-item short form of the Arizona Life History Battery (ALHB, Figueredo, 2007), with an internal consistency reliability of $\sim .70$, a test-retest reliability of $\sim .70$, and convergent validity of $\sim .77$ with the ALHB. The Mini-K has an assortative mating coefficient of $\sim .50$ and an interrater reliability coefficient of $\sim .60$ among both same-sex friends and romantic partners. We correlated the mean Mini-K score among pairmates (friends or lovers) to the squared differences between the Mini-K scores of pairmates. We controlled for both length of relationship (aggregated over both pairmate reports) and mean age of pairmates (because longer relationships might partially be a proxy for older people) to adjust for the longer-term relationships generally favored by slow LH strategists. Because short forms were used in this field study, we used estimated “true scores”, disattenuated for unreliability, using the specific sample means and sample reliabilities for each measure, culture, and relationship. The overall correlation between the adjusted pairmate means and the squared differences between pairmates on LH strategy (Mini-K) was significant and negative, as predicted by theory. This indicates that slow LH strategists do indeed practice systematically higher degrees of assortative pairing. Furthermore, this correlation was statistically equivalent across all three cultures as well as across both friends and lovers, as well as across the (non-significant but theoretically plausible) interactions of relationship and culture. This indicates that the difference between slow and fast LH strategist on assortative pairing is statistically identical across cultures and social and sexual relationships. These findings have profound implications for the continuing sexual as well as natural selection of individual variation in LH strategies among modern humans.

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Evolutionary life-history theory and severe personality disorder

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Evolutionary life history theory suggests that humans flexibly adopt different behavioural strategies in terms of mating and reproduction depending on the predictability of available environmental resources. Belsky, Steinberg and Draper (1991) have proposed a model according to which parents would be more likely to limit their parental investment in individual offspring under conditions of uncertain future resource availability for that offspring. High (actual or perceived) stress in the parental generation including marital discord would foster insensitive rearing styles, which in offspring would induce opportunistic interpersonal orientation, early biological maturation and sexual activity, and a preference for short-term unstable intimate relationships (Type I according to the model). By contrast, under favourable environmental conditions, parents would be more responsive to the offspring's needs, fostering the development of trustful interpersonal orientation, late biological maturation and sexual activity with enduring pair bonds (Type II). Here we tested the hypothesis that borderline personality disorder (BPD) represents the extreme (pathological) of variation of Type I behaviour, based on the well documented observation that patients with BPD frequently experience adverse events during early childhood including parental neglect or abuse, and, as adults, have difficulties in maintaining enduring social relationships. As predicted, patients with BPD were more likely to experience adverse early rearing conditions including parental marital discord and sexual abuse, and had more unstable short-term intimate relationships compared to a control sample resembling Type II. No difference was found regarding biological maturation. These results strongly suggest that personality development is associated with differences in life history strategies in predictable ways.

Early trauma and aggression in adulthood: The mediating role of attachment style

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In human beings, expressions of violent behavior are influenced by a complex and dynamic interplay of biological, psychological and social variables. Individual differences in aggressive behavior are at least partly heritable and presumably result from the interaction between genetic and environmental factors. It is well documented that early life environmental risk factors have long-lasting effects on reactivity to the social stimuli that elicit aggressive responses. The mechanisms that mediate the relation between early experience and adult increased aggression have been only partially elucidated. Different theoretical models point to insecure attachment as a mediating mechanism. Attachment theory is a theory of interpersonal relationships that proposes that the quality of early caregiving influences how an individual perceives and engages in subsequent relationships. An important corollary of attachment theory is that affect regulation (including the regulation of anger) is related to attachment style. Bowlby hypothesized that, fearing abandonment, persons with an insecure style of attachment can become suspicious and hostile, sometimes to the point of reacting with anger and aggression whenever the psychological “distance” from attachment figures increases. The life history model of attachment posits that early psychosocial stress and insecure attachment act as cues of environmental risk, and tend to switch development towards reproductive strategies favoring current reproduction and higher mating effort. Avoidant and ambivalent attachment also have different adaptive values for boys and girls, in the context of same-sex competition in the peer group: in particular, the competitive and aggressive traits related to avoidant attachment can be favored as a status-seeking strategy for males. We studied a large sample of psychiatric outpatients and healthy volunteers in order to test the hypothesis that an insecure style of adult attachment is associated with an increased risk for self-reported levels of physical aggression during adulthood. We found that levels of aggression were significantly higher in participants who had experienced traumatic events during the first 15 years of life and who described themselves as insecure on a scale measuring adult attachment style. When we repeated the analysis in the sub-sample of healthy volunteers, the results did not change. Our results are consistent with the theoretical models that view insecure attachment as a psychobiological mechanism that mediates the impact of early traumatic life events on the developmental pathway leading to later-life aggression.

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Impact of geography and language on the formation of the diverse European genepool

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Clinal patterns of autosomal genetic diversity within Europe have been interpreted in several studies in terms of a Neolithic demic diffusion model for the spread of agriculture; in contrast studies using mitochondrial DNA have traced many founding lineages to the Paleolithic and have not shown strongly clinal variation. We have used 11 human Y-chromosomal biallelic polymorphisms, defining so-called haplogroups as well as 7 rapidly evolving multiallelic STR (short tandem repeats) to analyze samples of about 3,600 and 12,700 European males from 47 and 91 regional population samples, respectively. Emerging patterns of geographic differentiation are highly non-random, and when they are assessed using spatial autocorrelation analysis or molecular variance analysis, they show significant clines. Clines have different foci and are regionally restricted and are likely to reflect distinct population movements as well as the consequences of patrilocality. For example, principal-components analysis suggests that populations in the Southeast of Europe belonging to quite different language families (Slavic, Italic, Greek) are related primarily on the basis of geography, rather than on the basis of linguistic affinity. This “Balkan-Danube” cluster is also a relatively short distance away from the “Turks” cluster and relatively distant to the eastern (Slavic) samples which is explicable by the Ottoman expansion and by the division between the spheres of influence of the Greek and Russian Orthodox Church. In contrast, the sharp distinction between the male lineages of Germans and Poles most likely reflects differences in language, culture, religion and history alone, because no geographical barrier exists between these neighbouring countries. Y chromosome analysis also highlights the genetic peculiarity of metropolitan populations (due to admixture) as well as of isolated minority populations (due to genetic drift and sometimes patrilocal clan structure). In summary, our studies provide clear evidence for a major genetic division of European males into Slavic-speaking eastern and Romance language-speaking

western populations separated by a central European block of Germanic and Italian-speaking populations. We conclude that Y-chromosomal markers displaying substantially different time-depths are capable of resolving male genealogies to an unparalleled degree and therefore provide a useful means to study local population structure and recent demographic history.

Recent human evolution and the behavioural unity of homo sapiens

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An assumption of human ethology and evolutionary psychology is that the populations comprising *Homo sapiens* possess the same innate behavioural repertoire. Strictly speaking, accumulating evidence of divergent human behavioural evolution weakens this assumption. But whether it invalidates it as a useful rule of thumb depends on the degree of diversity. Ancient adaptations such as the senses, handedness, the basic emotions, speech, and the dominance repertoire still appear to be uniform. But there is evidence of large variability in recently evolved behaviours including some bearing on pair bonding and educability. Models indicate the possibility of group differences in some economic behaviours. These quantitative differences would seem to require the modification of some theories of cultural evolution and economic development to incorporate local behavioural evolution. Despite advocating species universals Konrad Lorenz's theory of self domestication also showed the way to incorporate divergent human evolution into an ethological frame.

Part II

Tuesday, July 15th 2008

Plenary Session

12

Brain Asymmetry in Chimpanzees (*Pan troglodytes*): An Overview of MRI and Behavioral Evidence

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Contrary to an historical view that considers hemispheric asymmetry to be unique to the *Homo* genus and exclusively related to the emergence of language abilities, an impressive body of evidence collected since the mid 1970s by different researchers around the world has shown that left-right asymmetry of the brain is widespread in a variety of non-human species, and likely appeared very early on during vertebrate evolution. A number of researchers have assessed the presence of brain asymmetry in non-human primates; of particular interest among these studies are those that have focused on the so-called great apes, because of their close genetic relatedness to our own species. Here I will present an overview of studies conducted over the last decade on a large group of common chimpanzees (*Pan troglodytes*) housed at the Yerkes National Primate Research Center in Atlanta; such studies have assessed a) anatomical brain asymmetries using magnetic Resonance Imaging (MRI), b) behavioral asymmetries, particularly expressed as handedness for different tasks, and c) the pattern of relationships between anatomical and behavioral asymmetries. I will then discuss the implications of these findings on our understanding of the evolution of hemispheric asymmetry in higher primates and its possible relationship with the emergence of language.

Symposium: Evolutionary aspects of lateralization 13

Why are some people left-handed? An evolutionary perspective

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Since prehistory times, left-handers are ubiquitous in human populations, with geographical variations of their frequency. Here we reviewed the abundant literature available on the possible mechanisms and the consequences of being left-handed, to assess the evolutionary explanations of the handedness polymorphism in humans. We pointed out that hand preference is heritable; we also highlighted that hand preference is influenced by genetic, hormonal, developmental and cultural factors. The persistence of this polymorphism has been explained by evolutionary forces like frequency-dependent selection: data suggested that left-handedness, as the rare hand preference, could represent an important strategic advantage in fighting interactions. However, the facts that left-handedness is in low frequency suggested that some costs could be associated to left-handedness. Here is reviewed for the first time the available information on potential fitness costs and benefits associated with left-handedness. The identification of the selective forces influencing left-handers frequencies is not completed but this review will bring a new evolutionary light on the existence of left-handers in humans and raise new questions on fitness differences between right-and left-handers.

Behavioural lateralization and human social interaction

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There is a long tradition in the study of human lateralisation that to some extent overlooked important aspects of motor behaviour peculiar to social interaction. Recently it was shown that people tend to kiss each other in a lateralised fashion, turning their head rightwards. I will present further classes of motor and postural asymmetries observed in naturally-occurring situations. People meeting at public places (such as train stations and open air cafes) were observed and their turning preference when hugging each other was scored. Walking couples were observed (scoring the choice of side taken by the male and the female) and then briefly interviewed about their sidedness habits when watching TV on the sofa and when lying in bed. Observations carried out of pairs interacting in discotheques, where the loud music prevented normal conversation and talking into the other person's ear was thus mandatory, showed a preferential sidedness for spoken communication (and a study in which the experimenter asked for cigarettes in the left or right ear of the recipient exerted compatible results). Results, complemented by data obtained in semi-natural observations in children and on cradling behaviour in adult-infant interaction, indicated population-level asymmetries in most situations and are supportive of recent explanations on the evolutionary "social" reasons of brain and behavioural asymmetries.

Is pheromone perception in humans lateralized?

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Human olfactory lateralization has been investigated since the beginning of the last century, but nothing is known about brain lateralization in the processing of sexual signals conveyed by the olfactory and accessory systems. Moreover, little is known about how signals coming from olfaction, vision, and hearing combine together in order to provide the brain with useful information that could trigger mating decisions. A general feature of cross-modal perception is the fact that the response properties of a single modality following isolated stimulation are altered in the presence of concurrent stimulation of one or more other modalities. Cross-modal interactions, however, have rarely been approached from the functional standpoint of mate choice. Only a few studies, for instance, investigated the link between sex-specific preferences for putative human sex pheromones and sexually dimorphic facial characteristics, or the cross-modal interaction of voice and facial appearance in attractiveness ratings. Moreover, nothing is known on the lateralization in the interaction between pheromonal processing and vocal information (voice) or visual information (faces). Here we present recent results obtained in our laboratory which give preliminary answers to these questions, by making use of behavioral and psychophysical evidence.

Human Ethology and Pathology 14

Nonverbal communication affects the association between anomalous parental experiences and the course of depression.

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According to Bowlby's attachment theory anomalous parental rearing styles underlie the risk for depression in later life. Indeed, depression is associated with low levels of parental warmth, affection, and care, and to a lesser extent, with high levels of controlling and overprotective parental styles. Within the framework of Bowlby's attachment theory it is hypothesized that the association between early parental experiences and depression in later life is mediated by social interactions in adult life. However, adult social interactions that deviate from expectations based on early parenting behaviour may also moderate that relationship. So far the mediating and moderating role of adult social interactions between anomalous parental experiences and depression in later life has found support in healthy populations. In the present study we investigated whether nonverbal convergence between depressed patients' and an interviewer's displays of involvement either mediated or moderated the relationship between recalled anomalous parenting experiences and the response to antidepressant treatment. In previous studies we have demonstrated that the more these patient and interviewer converge their involvement displays to a similar level, the more favourable the subsequent course of depression will turn out to be. Moreover, behavioural observation studies have shown that such nonverbal convergence between mothers and newly borns predicts secure attachment. We tested the following hypotheses: 1) Parental bonding, in particular low levels of care and high levels of overprotection, predicts an unfavourable treatment response. 2) Lack of nonverbal convergence between patients and interviewers predicts an unfavourable treatment response. 3) Nonverbal convergence is associated with parental bonding styles. Furthermore, we explored whether nonverbal convergence either mediates or moderates the association between parental bonding and the subsequent course of depression. One hundred and four depressed outpatients participated in the study. At baseline they completed the Parental Bonding Instrument, a

questionnaire that assesses recalled maternal and paternal care and overprotection during the first 16 years of life. In addition, the patients completed a clinical interview that was videotaped for the purpose of behavioural registration. After the assessments the patients entered an 8 week treatment protocol. As hypothesised, low maternal care and high paternal overprotection predicted a poor response to an 8 week treatment. Maternal care was positively correlated with high levels of nonverbal convergence. Moreover, convergence moderated the relationship between maternal care and the response to treatment: Lack of convergence between patients and interviewers turned out to annul the positive effects of maternal care on the treatment response. The findings link theories on early parenting to interpersonal theories of depression.

Morning Sickness as an evolutionary mechanism of complex adaptation to pregnancy

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Morning Sickness as an evolutionary mechanism of complex adaptation to pregnancy Sebastian Kohl & Wulf Schiefenhövel (Max-Planck-Institute, Andechs, Germany) As a frequent and highly unpleasant syndrome during the sensitive period of early pregnancy Morning Sickness (Nausea and vomiting during pregnancy = NVP) has been intensively investigated. However many questions remain unanswered, particularly the counterintuitive association with a better pregnancy outcome (Klebanoff et al., 1985; Weigel & Weigel, 1989). In this cross-cultural study data were collected from 565 mothers, who had given birth recently in South Africa, Guatemala and Germany, using a standardized questionnaire interview containing 138 items. Assuming that Morning Sickness is a phenomenon of modern civilization (mismatch), we were surprised in finding a similar incidence in South Africa (63.8%), Guatemala (72.5%) and Germany (68.1%). Furthermore severity of NVP (frequency and duration of symptoms) was particularly high in Guatemala (the most traditional culture according to our evaluation). Compared to the absolute incidence of 68.1% (all three cultures), a tendency of additional risk for NVP was observable, when mothers reported factors, that required increased adaptation, e.g. primagravidity (+1.9%), problematic self-confidence (+6.0%), problematic nutrition (+1.7%), problematic health (+4.7%), psychological concerns (+6.8%) or increased need for social support, e.g. problematic financial situation (+7.4%), problematic living conditions (+7.6%), no income (+12.1%), no employment (+12.1%). This Study could not reproduce the known positive influence of NVP. No differences concerning course or outcome of pregnancy, delivery and health of newborn were found. Objective biological costs appeared to be low. Serious problems caused by NVP were rare, e.g. more than 6 times vomiting daily (1.3%). Yet symptoms seemed to have a strong subjective impact, e.g. severe suffering (36%) and minor side effects were frequent, e.g. reduced appetite (34.9%), feeling of weakness (43.2%). NVP was associated with aversions (73.8%) especially against meat (31.9%), craving (83.4%) especially for fruits (33.7%), hyperolfaction (81.7%), reduction of perceptual capacity (71.0%) and reduction of daily work (45.2%). Mothers with NVP reported an increased support from the partner more frequently (+9.9%). A pregnancy indicating function of NVP was recognized by 56.2% of the women examined. We suggest that Morning Sickness might be an evolutionary mechanism of complex adaptation to pregnancy. On the basis of a better outcome

some functional aspects of NVP were already discussed (Fessler, 2002; Flaxman & Sherman, 2000; Profet, 1992). NVP is advantageous and protective for mother and child through nutritional changes, withdrawal, increased social support and early realization of pregnancy. These adaptive changes can be realized as NVP is accompanied by craving, aversions and increased sensory perception. Our data support a dynamic adaptive function, since incidence of NVP seems to be increased, when there are high need and good possibilities for adaptation. We assume, moreover, that benefits of the mentioned mechanisms were especially high in an environment of evolutionary adaptedness, e.g. when other pregnancy indicators were rare and hygiene of nutrition was more problematic. The time correlation with critical embryogenesis is a strong argument for this multifactorial protection theory. Other functions might concern the high plasticity during this period: Finding an ideal head-pelvis-proportion is a considerable advantage of selection, thus NVP can perhaps serve as an energy restraining mechanism, to slow down an otherwise potentially dangerous growth rate of the child. Being affected by multiple external factors NVP might be a way of transmitting environmental information to influence the development of the child in a predictive adaptive response (Gluckman & Hanson, 2005), as a preparation for probable challenges of the future, e.g. stress or shortness of energy. These evolutionary mechanisms of adaptation might contribute to a better understanding of NVP's multifactorial etiology, its complex symptoms and positive effect on pregnancy. The new model, moreover, might allow doctors, family members or friends to react more adequate towards suffering mothers.

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Decoding of subtle facially expressed emotions in brazilian major depressed patients: Differences with non-depressed controls and the relationship with the course of depression

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Objective: Within the framework of a social-cognitive approach of depression it is hypothesized that impairments in the decoding of other's emotional states play an important role in the onset and course of depression. Indeed, evidence exists indicating that depressed subjects perform less well in the decoding of facially expressed emotions. So far, most studies have made use of full and intense facial expressions of emotions. However, among quotidian human interactions subtle expressions of emotions occur more often than intense ones. According to Beck's cognitive theory of depression, biases in the perception of subtle emotional expressions are of more relevance in depression than those in the decoding of clear emotional states. In line with this assumption, some studies have demonstrated that a negative bias in the perception of ambiguous faces, but not in the perception of clear faces, can predict the subsequent course of depression. In the present paper we studied the recognition of subtle facially expressed emotions in a sample of Brazilian depressed patients and non-depressed controls. We investigated whether and how 1) patients with major depression and healthy controls differ in the ability to accurately decode subtle facially expressed emotions, 2) impairments in the decoding of subtle facially expressed emotions predicts the short-term outcome of depression. Since women are more accurate in the decoding of nonverbal social stimuli than men, we considered possible effects of gender in the data analyses. **Methods:** Participants were 32 depressed out-patients (9 men) and 76 non-depressed controls (34 men). At intake, the patients received the diagnosis of major depression during a clinical interview conducted by a trained psychiatrist. The patients also completed the Beck Depression Inventory (BDI) to assess the severity of depressive symptoms and Ekman's Reading Faces Test. This test is constituted by a set of 14 photos of subtle expressions of seven emotions (sadness; disgust; elation; anger; fear; surprise, contempt) posed by a young woman. Participants had to identify the emotion portrayed on each photo. We computed the accuracy in the decoding of facial expression (% of faces correctly identified), the positive bias (% of faces incorrectly identified as elated) and the negative bias (% of elated faces incorrectly identified as expressing a negative emotion). After the assessments, the patients received antidepressant pharmacotherapy. To assess the short-term outcome of depression patients also completed the BDI at 8 weeks after (T1). Controls completed the BDI and the Ekman's Reading Faces Test only once. **Results:** Depressed men were more accurate in the decoding of the facial expressions than male controls (Mann-Whitney U Test, $p = 0.02$). Depressed women were less accurate in the decoding of elated faces than female controls ($\chi^2 = 6.825$; $p = 0.09$). The accuracy score did not predict the short-term outcome of depression. However, we did find that the interaction between gender and positive bias predicted outcome ($p = .013$): a positive bias tended to be associated with a poor outcome in men ($p = 0.055$), but not in women. **Conclusion:** Our results indicate that Brazilian depressed patients and non-depressed controls differ in the decoding of subtle facial expressions and that this difference is gender specific. In line with Beck's Cognitive Theory of Depression we found that the bias in the perception of emotions was associated with the subsequent course of depression and that this finding is also gender specific. Despite the limitations of a small sample size and the use of only one female stimulus, we do feel that it is justified to conclude that the present findings underscore the role of a social cognitive bias in the decoding of facially expressed emotions in the course of depression. The present data further underscore the usefulness of subtle emotional stimuli in research related to decoding abilities in depression.

Attractiveness and Mating 4 15

What do I have that is special? Market value and assessment of a romantic mate

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Several studies have dealt with the process of choosing romantic mates in human beings, emphasizing the important characteristics in a mate and/or assessing characteristics for their degree of importance, but always focused on ideal mates. The characterization of interests and of the selection behavior of men and women influences the assessment of and comparison among individuals of the desired sex. The assessment of these individuals is based on their different characteristics and on the intensity of expression of each one. The existence of a “romantic market” has been observed, where subjects are exposed and in which they have their own “market value” based on their individual characteristics and on the context in which they find themselves (social and environmental). The “market value” of a person may also influence the value of the mate that this person can attract and retain. The aim of our study was to investigate the influence of self-assessment in the evaluation of the romantic partners. The participants, 156 Brazilian students (88 women and 68 men aged between 18 and 29 years), assessed new traits (beautiful face, beautiful body, health, ambition/hard workingness, sociability, financial condition, intelligence, good humor and sincerity). Each subject performed two assessments: one of the actual mate (current or most recent) and the other of themselves. In the simulations, each of the characteristics was awarded scores ranging from a minimum of zero to a maximum of five points. For each trait, the data were analyzed using the GLM test for repeated measures with two sex factors between participants (male versus female) as well as two profile assessment factors (self-assessment versus mate assessment). The significance level was set at 0.05. In the cases where interaction occurred, it was investigated using t-tests (paired or independent). In these cases, since there were four simple tests, the significance level was adjusted to 0.0125. Self-assessment of both the face and the body of men and women was similar. However, men scored the body and facial characteristics of their mates higher than they did the same characteristics in themselves. This difference was not observed in the women. These data confirm the great importance that physical characteristics

have for men assessing the characteristics of potential mates. With respect to the ambition/hard workingness trait, the women awarded similar scores for both themselves and their mates, whereas the men scored their mates lower than they did themselves. The fact that self-assessment values of this characteristic were similar for both sexes suggests that the ambition/hard workingness characteristic is considerably relevant for women during their search for a mate. Women choose mates whose goals and ambitions are as high as their own. The lower score that men gave their mates suggests the low importance given by the former to this characteristic. For the humor trait, the women scored themselves and their mates equally. The men, however, considered themselves more good-humored than women. This shows the importance that women give to humor, given that they choose mates who have the same level of humor. For the men, low humor levels in their mates does not impede couple formation and indirectly provides a measure of the value of this trait for women. Regarding intelligence, men rated themselves higher than did women. Even though we found no significant differences between the women's assessment of their own intelligence and of that of their mates and between the men's self-assessment of intelligence and of that of their mates, we observed two tendencies: the women assessed their mates higher than they did themselves and the men rated themselves higher than they did their mates. We found no significant differences between the remaining characteristics investigated (health, financial condition, sociability and sincerity). Our results indicate that the assessment of characteristics in romantic mates using self-assessment and assessment of the actual mate is similar to those found in studies that describe ideal mates. The differential of this study lies in the consideration of more concrete references, given that we assessed real mates. This approach also allowed us to investigate the market value of the raters in relation to the characteristics of their mates.

Sociosexuality and Discount of the Future: Decision making and resource allocation mechanism

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Individuals must invest considerable time, effort, and energy to accomplish the major tasks that most directly affect their inclusive fitness: surviving to reproductive age, reproducing successfully, and rearing offspring until reproductive age. Although the investments in these aims are crucial to the inclusive fitness, it also has costs and enhanced some kind of risks. Thus, adaptations have "opportunity costs" associated with them costs that accrue from loss of fitness benefits that might have been achieved by using resources in different ways. A major "modern Darwinian" insight is that one must weigh the benefits against the costs to evaluate whether and how adaptations evolved during evolutionary history. The fundamental goal of evolutionary analysis is to specify the cost-benefit "trade-offs" that led individuals to allocate their time, energy, and effort to activities in ways that increased their ancestors' inclusive fitness. The trade-offs are illustrated by the differential allocation of efforts to parenting versus mating activities. Parental investment is any investment by the parent in an individual offspring that increases the offspring's chance of surviving (and hence reproductive success) at the cost of the parent's ability to invest in other

offspring. This definition implies a basic trade-off. Parental investment can increase the probability that offspring will survive and subsequently reproduce, yielding greater fitness. However, parental investment also has costs. Indeed, the amount of investment is measured in units of lost benefits of alternative investment (i.e., lost opportunities to invest in other offspring). Individuals who engage in parental effort (the total sum of parental investment in all offspring) could be doing other things with their limited time and energy, such as devoting greater effort to mating (e.g., attempting to attract additional mates). Thus, costs include the lost benefits of potentially productive yet foregone activities. This notion is the basis of the sexual strategies, but has not been fully incorporated into existing theories of human mating. The sexual strategies (or mating strategies) are integrated sets of adaptations that organize and guide an individual's reproductive effort. They influence how individuals select mates, how much mating effort they expend, how much parental effort they expend, and so on. Strategies typically are defined as genetically based programs (i.e., decision rules) that individuals use to allocate their somatic and reproductive effort to specific alternative phenotypes (i.e., mating tactics) in adaptive ways. Looking at it in this way, human psychology and its physical substrates can be thought of as a distributed processing system, utilizing multiple modalities, that both serve to allocate time and energy efficiently among alternative and competing functions and is itself subject to selection based on its immediate and long-term costs and benefits. The present research tries to infer the relationship between sexual strategies and "discount of the future" as result of the same mechanism of decision-making and resource allocation. The principle of Discounting of the Future comprehends a decision making mechanism and tries to understand the existing preference for an imminent goods over more distal future goods, which varies across species, sexes, age, classes, and environmental circumstances. We recruited 166 undergraduates from a selection of Public Brazilian Universities, and from different courses. The sample included 83 male (age: $22.79 + 3.77$ years) and 83 female (age: $22.61 + 2.80$ years). The instruments used were the Sociosexuality Inventory and Discounting of the Future Scale. As expected, we have found inter-sexual differences about sociosexuality scores ($F = 27.143$; $p = 0.000$) and the discount of the future choices ($\chi^2 = 8.079$; $p = 0.018$), replicating the literature results. In our intra-sexual analysis, the female results showed us a positive correlation between sexual strategy and discount ($\chi^2 = 6.053$; $p = 0.048$). However, the male data did not show any correlation. Our results indicate that we could have a resource allocation mechanism controlling sexual strategy and discount of the future, however this mechanism could differ for the sexes, having different sensibilities and specificities.

Dominance hierarchy as integral to reproductive suppression; an adaptation consequent to the evolution of the male

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Dominance hierarchy (DH) is often thought to result from competition for resources and to function to bias access to or control over them, thereby reducing fitness lowering mutually unproductive contest. I theorize that albeit in some species resources may be allocated according to rank, this is merely a by-product of DH, not its root or function. Dominance is often misconceived because of the way in which data is collected, and a more empirical and consistent conceptualisation of dominance – which reveals DH to be fundamentally same-sex – indicates DH instead

to be a means of allocating mating access. It is an epiphenomenon (but requiring evolved neural capacities of all individuals to record outcomes of contests which bias behaviour in subsequent encounters) whereby same-sex individuals ranked by 'mate value' enables not just corresponding opposite sex mate choice but, more fundamentally, physiological reproductive self-suppression of each individual to some corresponding degree. This would seem to vary along a continuum from in some species (most 'co-operative breeders') a 100% reproductive skew with total suppression of all individuals bar the sole breeder, to in most others a gradient down the length of the DH (though how fine or rough is a correspondence has not been investigated). (Notwithstanding that DH also manifests as a female phenomenon, notably in some social insects where there is no male sociality at all) DH thereby makes wider sense as a major part of the process of testing males so as to 'filter' genetic material of the reproductive group to eliminate/ retain what is deleterious/ enhancing (a mechanism proposed by Wirt Atmar) – this being the process that is either the reason for which the male mating type evolved, or its major consequence and reason why separate mating types were maintained. That DH and differential physiological reproductive suppression are integral is very well illustrated by looking at the extreme end of the continuum in 'co-operative breeder' species to see how the two phenomena vary with the permutations of elements of their various social organisation (such as in-breeding avoidance, dispersal ahead of sexual maturity, etc). Sure enough, whether you consider vertebrate or social insect species, when one or both sexes exhibits a DH, there is corresponding differential physiological reproductive suppression. There is theoretical confusion in the literature regarding mechanism, between 'dominant control' and 'self-restraint' models, and this may reflect a phylogenetic development from dominant signalling to autonomous hormonal control – differential physiological self-suppression being of tactical benefit to all rankers, just as is membership of the DH. The biochemical basis of the mechanism is also not clear, with the conventional stress-based model (cortisol) under attack, but this would seem also to be through failure to properly understand DH – to correctly identify whether or not a DH is present. Contents * Introduction * Dominance is often misconceived because of the way in which data is collected * Where dominance is assumed but actually is not applicable; it is not inter-sexual * There are clear reasons why the sexes evolved not to engage in terms of dominance * Dominance hierarchy is a real phenomenon, and one tied to reproductive suppression * The epidemiology of the stress dimension of reproductive suppression * Questioning stress mediated reproductive suppression * Unusual social systems help to reveal common reproductive suppression mechanism * How the evolution of sex and the male sheds light on the function of dominance hierarchy * No resource (unless you so consider sex) could have eclipsed sex to explain DH evolution * Re-drawing the false picture of dominance

Evolution of human social monogamy by maximization of inclusive fitness

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Social monogamy is prescribed in approximately 15% of human societies, and its current distribution is usually viewed as a consequence of the diffusion of Christianity. However, legally required limitations on number of spouses appear in the earliest written records, such as the Code

of Hammurabi; further, monogamous marriage was strictly enforced in pre-Christian Greece and Rome. Why, then, do some cultures prescribe social monogamy, when men are allowed to marry polygynously in 85% of human societies? The prevalence of polygynous marriage is readily explained in evolutionary terms. In sexually reproducing species, the variance in reproductive success is considerably higher for males than for females: in mammals, this typically leads to a polygynous breeding system characterized by high male investment in “mating effort”, and high female investment in “parental effort”. Extension of this paradigm to humans explains the prevalence of polygynous mating and marriage across human societies; in fact, monogamous marriage rarely, if ever, corresponds to monogamous mating. We use a game theory approach to model human marriage strategies as the outcome of male-female conflict over the allocation of wealth to the next generation, which incorporates assumptions about the effect of resources on individual fitness. Results indicate that, depending on the nature of the resources, monogamous marriage may maximize inclusive fitness. We suggest that human social monogamy represents an adaptive strategy that evolved where females grant monogamous males a high probability of paternity, in exchange for exclusive investment of heritable resources in their offspring. We discuss this model in light of the historical and ethnographic evidence, and test its predictions with comparative analyses of cross-cultural data. Because the effect of resources on reproductive success differs across subsistence systems, our findings suggest that the skewed cross-cultural distribution of marriage strategies may reflect differences in the prevalent mode of production across geographic areas: marriage is typically polygynous in the pastoral and horticultural societies of sub-Saharan Africa, and monogamous in the agricultural societies of Eurasia with economies based on the intensive use of land. Further, they suggest that limitations on polygynous marriage may have originated in the ancient land-based civilizations of Eurasia, such as Babylon, Greece, and Rome, concomitantly with the shift to intensive agriculture, possibly coupled with the cultural norms promoting high paternity certainty, which were strongly enforced in these societies. In other words, the proximate explanations for human marriage systems, often couched in economic terms, may ultimately subsume a reproductive motive.

Development 1

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Development of Theory of Mind from ages four to eight

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Historically, Theory of Mind (TOM) research culminates with the preschooler's mastery of the false-belief task (Perner, 1991; Wellman, 1990). We argue, however, that false-belief understanding is merely one building block in acquiring a mature TOM. Previous empirical study reveals that children's ability to detect the hidden intentions of others and, reciprocally, children's awareness that others may use nonverbal cues to detect one's own intentions are not present in the average preschooler (Bering & Parker, 2006; LaFreniere, 1988, 1998). Preschoolers leak information because they lack the ability to inhibit their own expressive behavior (LaFreniere, 1988), to use nonverbal signals to amend and guide their behaviors in a competitive situation (Freire, Eskritt, & Lee, 2004) and to use recursive awareness of intention to guide their strategies in a competitive situation (Schultz & Cloughsy, 1981). The current study seeks to clarify the development of TOM immediately after age 4. In particular we seek to outline the emergence of a recursive awareness of a partner's intention as a result of unfolding verbal and nonverbal cues in a social interaction. Understanding intentionality involves the ability to perceive a partner's actual intent, regardless of stated objectives and such ability is a crucial component of a child's mature TOM. To successfully interact in a competitive context one must be able to: recognize that others' have goals that may differ from one's own, decode and interpret intentions, detect contingencies between verbal and nonverbal behavior and ultimate actions, and regulate expressive displays in ways that lead to advantageous outcomes. The present study is comprised of two experiments that engage 120 predominantly white, middle class children (40 each of 4-, 6-, and 8-year-olds) in a guessing game paradigm. Experiment 1: Encoding, examines age differences in children's understanding and ability to manipulate their own nonverbal cues in order to influence the behavior of a partner based on their understanding of recursive awareness of intentionality. Successful manipulation of their own behavior demonstrates that they are not only aware of what cues their partner is using to detect intentions but that they also have developed the ability to inhibit true signals and fabricate convincing false ones. Experiment 2: Decoding, examines children's ability to detect nonverbal

contingencies that reveal their partner's hidden intentions. Four conditions systematically link the veracity of a nonverbal cue with a nonverbal social signal. Children who detect this contingency will be able to "guess" correctly on each trial of the game. Based on previous research, we hypothesize that the skills required to successfully complete these tasks are not present in the average preschooler but show significant development over the age range selected for study. The following hypotheses were formulated with respect to age: Experiment 1: Encoding — Eight-year-olds will be more successful at inhibiting leaks via non-verbal behavior than 6-year-olds, who will in turn be more successful than 4-year-olds. — Eight-year-olds will demonstrate the ability to fabricate false cues to manipulate a partner's beliefs more than 6-year-olds, who will in turn fabricate cues more than 4-year-olds. Experiment 2: Decoding — Eight-year-olds will be able to detect revealing behaviors significantly more than 6-year-olds, and 6-year-olds significantly more than 4-year-olds. This research will contribute to a sparse literature on the development of TOM beyond false-belief tasks that are routinely solved by age four. Data collection is in progress and at the time of this submission, approximately one half of the participants have completed the study. Preliminary analyses reveal the following age trends in the data. Older children demonstrate a greater ability to inhibit their nonverbal signals, use an irregular strategy when attempting to trick a partner, and are also more likely to use false or misleading nonverbal cues than younger children. In turn, all of these new abilities lead to more success in the game. Note: 2007 Aldis award winner

Maternal IQ and child mortality in 222 serbian roma (gypsy) women

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A significant negative correlation ($r = -0.26$) is found between maternal IQ measured by the Raven's Matrices and child mortality in 222 Serbian Roma (Gypsy) women. Statistical adjustments for schooling, age, religion, number of marriages, age at first reproduction, and birth spacing did not remove the correlation. Indeed, maternal schooling had no association with child mortality after controlling for IQ. We suggest that in addition to cognitively mediated self-management, an explanation for the relationship may lie in a cross-species life-history theory in which IQ scores are linked to brain size and a robust constitution.

2D:4D ratio, aggression and conflict resolution in Hadza children: School and bush compared

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In this study we test the social learning hypothesis concerning aggression and conflict resolution styles in 2 samples of Hadza children: living in the bush and living in the boarding school.

Hadza are egalitarian hunter-gatherers, living in Northern Tanzania. The data were collected on 189 children (91 boys and 98 girls). 44 Hadza children were living with their parents in the bush, and 145 children stayed in the boarding school. Right hand 2D:4D ratio was significantly lower in boys compared to girls in the total sample (0.95 versus 0.97, $t = -3.28$, $p = 0.001$), as well as in bush and school samples. Gender differences in aggression and conflict resolution were much higher at school compared to the bush. Schoolboys rated significantly higher compared to girls on the following patterns: physical aggression, indirect aggression, third-party intervention in the conflict. In the bush sample no significant gender differences in social behaviour were registered. Schoolboys rated higher on all mentioned above patterns compared to boys from the bush. In addition, schoolboys also rated higher on constructive conflict management, protection of others in conflict, avoidance and victimization. Schoolgirls scored higher on verbal aggression and constructive conflict management, while the bush girls scored higher on physical and indirect aggression. Conclusions: Hadza children being subjected to multiethnic school environment demonstrated the development of culturally different model of social behaviour (novel to Hadza) compared to their peers remained in the bush and being subjected to traditional egalitarian social environment. Our data confirmed the social learning hypothesis. This study was supported by Russian Foundation for Humanities (grant 07-01-18009e) and Tanzania Commission for Science and Technology (COSTECH).

Mother-infant interactions in urban brazilian dyads: affective aspects, behaviors, complexity and predominant parental systems.

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Initial mother-infant interactions seem to be adaptative and fundamental to early development. To investigate them is essential for the understanding of human ontogenesis. They seem to present changes across the first years of babies' development. As infants develop, they display an increasing interest in objects during interactions with their mothers. The dyadic interactions are gradually transformed into triadic interactions. This study compares data of observations of mother-infant dyads, analyzing the behaviors of the partners, the complexity of the exchanges and its affective component. Besides those aspects, the occurrence of each of Heidi Keller's parental systems was analyzed, aiming to identify the main socialization tendency of those Brazilian dyads (toward autonomy, interdependence or relational-autonomy). The participants were 56 Brazilian dyads (28 with one-month old babies and 28 with five-month old babies), filmed in their houses in free situations, during fifteen minutes, in the city of Rio de Janeiro. The dyads observed were from middle and low class. The baby was the first child of the family and mother and father were living together at the moment of the images were registered. The mean age of mothers were 28 years old ($SD = 6.2$) for the first group and 31 years old ($SD = 6.4$) for the second group. Interaction episodes were identified and analyzed according to frequencies and duration of interaction for each dyad. The frequency of shifts in mother behavior related with babies' behavior in interactions was computed; mother's behaviors during interactions (gestures, vocalizations, looking at babies' face,

talking with him, caressing, kissing, smiling, etc.) were registered. Babies' behavior directed at the mother during the interactions was also coded: looking, touching, nursing, grasping objects, smiling and vocalizing. Each interaction was also coded according to the presence of one parental system (primary care, body contact, body stimulation, object stimulation and face-to-face). Some of the behaviors, observed in interaction episodes, were categorized into affective behaviors (such as smiling, kissing and affective touching). The results did not indicate significant differences in the means (frequencies) of interactions by dyad, but these interactions showed differences in their complexity and in the manifestation of reciprocal affectivity of the partners. Babies' and mothers' age are important aspects for the constitution of interactions. They are mainly face-to-face when the babies are one-month old, and the system of object stimulation is predominant when the babies are five-month old. This indicates a tendency observed in western urban groups. The affective manifestations and the presence of interactions which are characterized by the system of body contact favor the formulation of a hypothesis of the presence of an autonomous relational pattern. The results confirm literature how much to the possibility of exchanges in initial stages of the development and the study contributes for the knowledge of their characteristics. The affective aspect is stressed, and its constitutive role in interactions is emphasized, assuming its importance in child development.

Interpersonal Relationships 17

Warmth and security of attachment: Exploring the relationships

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Nurturance/love is separate from security of attachment (MacDonald, 1992, 1999a), with functions, different emotions, a different distribution among the primates, a different pattern of theoretically expected sex differences, different mechanisms (a neurological reward system versus the internal working model), and different patterns of heritability. Regarding the latter, recently Bokhorst et al. (2003; see also O'Connor & Croft, 2001) found negligible heritability for attachment security; many studies have shown the heritability of personality dimensions related to Nurturance/Love (e.g., Bouchard, 1996). Nurturance/love and security of attachment likely underlie different aspects of close relationships. Reflecting its function as a system designed to protect the infant in times of uncertainty, the attachment system assesses the extent to which others can be trusted to help. The Experiences in Close Relationships Inventory (ECR) (Brennan, Clark, & Shaver, 1998), a measure of adult attachment, contains two factors, labeled Avoidance and Anxiety. The Anxiety factor is a measure of security conceptualized paradigmatically as fear of abandonment, while the Avoidance factor measures the extent to which people are attracted to close relationships for their own sake. This paper provides data relevant to testing this difference by assessing patterns of association between a personality measure of nurturance/love and a measure of adult attachment security. 419 undergraduates ((83 males, 336 females) filled out the Experiences in Close Relationships Survey (ECR, a measure of adult attachment) and the Revised Interpersonal Adjectives Scale-Big 5 (IASR-B5). The IASR-B5 includes a dimension of Nurturance/Love orthogonal to a dimension of Dominance. Unlike many other personality measures, these dimensions preserve evolutionarily expected sex differences, with females higher on Nurturance/Love and males higher on Dominance. It was hypothesized that the Nurturance/Love dimension of the IASR-B5 would be correlated with the Avoidance factor of the ECR but that there would be no association with the Anxiety factor of the ECR. Results: A principle components factor analysis of the ECR yielded the expected dimensions of Avoidance and Anxiety. There was no sex difference in Anxiety but there was a trend for a sex difference in Avoidance (Females < Males; $p = .093$).

The Nurturance/Love dimension of the IASR-B5 showed the expected sex difference (Females > Males; $p < .000$), and there was a trend for a sex difference in Avoidance (Females < Males; $p < .10$). As expected, Nurturance/Love was significantly correlated with Avoidance ($r = -.277$; $p < .000$); there was a trend Nurturance/Love was also slightly correlated with Anxiety ($r = -.097$; $p = .052$). Anxiety (but not Avoidance) was also correlated with Neuroticism ($r = .402$; $p < .000$). These results confirm the hypotheses. However, there was a moderate correlation between the Anxiety and Avoidance dimension ($r = .37$; $p < .00$), indicating that although these mechanisms are conceptually and empirically separate, they do share considerable common variance.

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An evolutionary perspective on breastfeeding after non-labour caesarean section delivery

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Caesarean section has become very common worldwide (Donati 2003; Klein et al. 2006; Lee et al. 2004; Mayor 2005; Menacker 2005; Walker 2004) yet the ways in which this surgical mode of delivery alter the postpartum interactions of mothers and their infants have received little attention. Previous studies associate operative delivery with less early contact with the baby (Rowe-Murray & Fisher 2001), later breastfeeding initiation (Rowe-Murray & Fisher 2002) and delayed onset of lactogenesis II (Chapman & Perez-Escamilla 1999). Although commitment to breastfeeding is associated with its achievement regardless of birth mode (Kearney et al. 1990), the practical and physiological consequences of operative delivery may contribute to the lower breastfeeding rates observed in caesarean populations (Francome et al. 2003; Mander 2007). Until recently in our evolutionary history, mothers and newborns have mutually regulated their postpartum physiology via unhindered contact after the spontaneous-onset of labour and a drug-free vaginal birth.

However, undergoing and recovering from caesarean section delivery disrupts behaviour vital to breastfeeding establishment (Trevathan 1987). Maternal interactions are initially hindered due to mobility limitations from the anaesthesia and incision wound, rendering women less capable of responding to their infants during circumstances in which the newborns need greater care than usual. As a consequence of the different physical and hormonal experiences, infants who are delivered by non-labour caesarean section are at greater risk of breathing difficulties, lower metabolic rate, less alertness and decreased neurological response in the immediate postpartum period compared to those vaginally-delivered (Lagercrantz & Slotkin 1986; Otamiri et al. 1991). Breastfeeding is additionally compromised because infant nursing reflexes, such as rooting and sucking, may be depressed by surgical anaesthesia and then postpartum medications (Howie and McMullen 2006; Trevathan 1997). These physical and pharmacological obstacles pose a challenge to early feeding - which is a public health concern because breastfeeding duration is shorter the later it is initiated (Hamlyn et al. 2002). Labour experiences and postnatal interactions also affect maternal endocrine profiles, which further impact infant morbidity and the lactation process (Lothian 2005; Odent 2003). There is evidence that caesarean section delivery fosters later, less effective secretion of the two key hormones associated with lactation, prolactin (milk production) and oxytocin (milk secretion), than occurs after vaginal delivery (Nissen et al. 1996). With breastfeeding, there is a 'window of opportunity' within which nipple stimulation needs to be initiated to promote prolactin receptors in the breast tissue to facilitate milk production once the process switches to autocrine control (De Carvalho et al. 1983; Hinds and Tindale-Biscoe 1982; Zuppa et al. 1988). Then, the frequency, intensity and duration of suckling regulate the milk volume and nutrient content (Johnson and Everitt 1983). McKenna et al. (1997) demonstrated that closer sleep proximity promotes breastfeeding and Ball et al. (2006) documented more frequent postnatal ward nighttime feeding when infants were bedsharing or using a side-car crib than those randomised to a standalone cot in vaginally delivered single full term infants. The aim of our research was to test the hypothesis that enhanced postnatal ward maternal-infant proximity afforded by side-car cribs (intervention) would lead to more frequent breastfeeding in a cohort of non-labour caesarean section mothers and newborns compared to those with the standard standalone cot (control). The non-blinded randomised controlled trial compares nighttime infrared video and audio recordings of maternal and infant behaviour and semi-structured interview data that was collected from January to December 2007 in a teaching hospital in Newcastle-upon-Tyne, England. Thirty-four tapes of women who prenatally intended or considered breastfeeding were subject to ethological coding using taxonomy developed by Durham Parent-Infant Sleep Laboratory. Preliminary analysis found that the women who were prenatally randomised to have their infants in the side-car cribs after non-labour caesarean section breastfeed more frequently (1.27 times per hour) and for a greater proportion of the observed period (15.48 percent) on average than the control group (0.58 times per hour and 9.33 percent). Video clips of mother-infant interactions are embedded in the PowerPoint presentation to highlight the novel obstacles to postpartum care and breastfeeding. This research was funded by the University of Cambridge Parkes Foundation and the International Society for Human Ethology Owen F. Aldis Fund. The Newcastle and North Tyneside Research Ethics Committee 1 approved COREC reference 06/Q0905/104.

Effect of social influence on food neophobia

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Eating is one of the behaviors that we experience naturally within a social group environment and studies have shown that the presence of other individuals modifies individual eating patterns, increasing, for example, the amount of food ingested and the duration of meals. In our study we used three experimental conditions to analyze the effect of social influence on human eating behavior, especially food neophobia. In the first condition, we assessed 290 subjects who were individually tested on a choice between two types of food: a common pâté and another not commonly found in Brazil. This experiment was called Control Condition, since the subjects made their choice without being influenced by any other individual. The second experiment, called Individual Condition, used the same procedure to assess 253 subjects, except that before making their choice, the subjects were influenced by the researcher, who expressed a positive or negative opinion about the uncommon pâté. In the last experiment, called Collective Condition, 47 subjects were tested in a group situation and were able to freely eat the four types of pâtés available (two common in Brazil and two not commonly found). In this experiment, the social influence exerted on the subjects came from the individuals themselves. At the end of each experiment, the researcher recorded the food items consumed by the subjects and asked them about their previous knowledge of these foods. We consider, therefore, that the individuals made a neophobic choice when they decided to consume food that they already knew or when they preferred not to consume any food. We defined the situation when the subject decided to consume an unknown food item as a neophilic choice. A comparison among the three experiments performed indicates that the greater the social influence on the subjects, the lower the occurrence of neophobic choice ($\chi^2 = 23.240$; $p = 0.00$; $gl = 2$). In the Control Condition, we observed a lower incidence of neophilic choice than in the other conditions. In the Individual Condition, neophobic choice was less frequent among the individuals, resulting in an equal distribution between these two choices. In the Collective Condition, whose social influence is characterized by the comments that the subjects themselves direct to members of their group, there was a considerable decrease in the occurrence of neophobic choice. We also found that, in the Collective Condition, the subjects who made neophilic choices tried a larger number of food items than the others did ($t = 7.808$; $gl = 44$; $p = 0.000$). Furthermore, in this experiment, the subjects who reported that they received positive social influence tried, on average, more food items than those who said that they were not influenced ($t = 3.156$, $gl = 44$, $p = 0.003$). In our study, we found that social context had an effect on food neophobia, which declined as a function of the increase in social influence. This finding suggests that individuals who take part in the daily life of an individual act as references in relation to food items. During the eating episodes, we observed that individuals spontaneously provided information and shared their experiences about the foods, possibly facilitating their ingestion and thus, decreasing neophobic responses within the group. The relation that we identified between the diversity of the food items consumed and the perception of receiving positive social influence, declared by many individuals, may indicate that the group promotes an environment favorable to the acceptance of new foods. The results of the present study contribute to a greater understanding of the social aspects of eating behavior, reinforcing the concept that the act of eating does not depend exclusively on the sensory characteristics of food items, but also on the context in which they are consumed.

Do affective disorders have an evolutionary basis?

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Background: While humans share the basic aspects of their emotional reactions with other socially organized mammals, long-lasting episodic alterations of mood (like those characteristic for manic-depressive illness) seem to be rather specifically human. Evolutionary theories of emotion have suggested a variety of functions for depressed affect, e.g. solicitation of help, focussing on salient problems, avoiding of competitive conflicts. However, at present, there is no consensus about the adaptive function of low mood or elated affect, nor do we know why it sometimes reaches extreme and obviously dysfunctional intensity and duration in patients. To study triggering life-events as well as changing action tendencies in patients with affective disorders may lead to results with relevance for the underlying evolved affective mechanisms. Methods: We studied 50 inpatients with a major depressive episode at two time points and compared them to 50 matched controls without psychiatric illness. We recorded affect variables and measured alterations of self-reported action tendencies over time with 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). We also assessed stressful life-events before the episode and their subjective appraisal with a standardized interview. Results: The Mood and Behaviour Questionnaire reliably discriminated between different categories of action tendencies. Help-seeking behaviour was not increased during episodes of depression, problem solving behaviour was somewhat increased towards resolution of the episode. Competitive behaviour correlated negatively with depression and low mood, but hedonic behaviour was suppressed as well. Life-events threatening the ability to compete socially were more frequent in patients than controls, so were life-events implying need for help. Conclusion: Seen in context, the results indicate social relations as the main target of the mood system with some support for a special role of social competition. The evidence for the help-seeking hypothesis is mixed. A meaningful interpretation of the role of life events is hardly possible without referring to appraisal processes. One may speculate that these cognitive appraisal processes give rise to the possibility of feedback loops. Such feedback loops might be responsible for the human capacity to experience intense and prolonged states of negative (or positive) affect known as affective disorders.

Development 2

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Rapid language shift in early second language learning: An evolutionary perspective

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Early second language learning can proceed fairly quickly when children enter school. But remarkably, abilities in the first language can suddenly diminish upon immersion into the new language environment. It has been shown that within a few months of starting school at kindergarten in English, children who previously spoke only Spanish lose much of their ability to name pictures in Spanish. We have also observed very unexpected inabilities of these kindergartners to perform a simple rapid naming task in Spanish where pictures of very common objects or primary colors are presented repeatedly (Oller et al., 2007). Furthermore, there is evidence in our work that Spanish pronunciation deteriorates rapidly, and comes soon to be contaminated by English phonetics (they tend to speak Spanish with “an English accent” within the first months of exposure to English). These weaknesses in Spanish apply to children whose parents report that prior to schooling, they heard and spoke Spanish only in the home, as well as to children who had some exposure to English prior to beginning school. It appears, then, that there is an abrupt shift in children’s focus on language as soon as they are immersed in the new language. Why should children suddenly have substantial limitations of access to a language that has been the primary form of communication for their entire lives? In the past it would not have been unreasonable to assume that there would be a gradual increase in the ability to speak the new language, and a gradual decrease in the ability to speak the home language, if and only if the child stops using the home language, even at home – this is the pattern of learning that has been called “subtractive bilingualism” (Lambert, 1975). The changes, however, in abilities in the home language do not appear to be gradual, but are instead quite abrupt. The apparent loss of ability in the home language should be interpreted both proximally and distally: proximally in terms of immediate social requirements of schooling, and distally in terms of long term potential benefits for mating and alliance formation. The distal interpretation is of particular interest because it implies that children, even at 5 years of age, are already adapted to adopt a focus for language learning that (even at the cost of loss of prior

abilities) places especially high priority on communication in the primary language of peers, the group from which potential mates and primary alliances will most likely be drawn. Evidence from language usage in various school environments suggests that it is indeed peer language use that drives the shift to preference for the school language. Teachers' language use has less impact on the shift of preference in language by the children, as shown by the fact that the shift to English preference occurs even in schools where teachers and children speak Spanish in classroom activities half the day (in so-called "two-way" programs) (Oller et al., in press). The evidence as a whole, then, is compatible with an interpretation that emphasizes long-term evolutionary forces that may have selected language learning inclinations adapted specially to acquiring the language of peers, and to shifting rather abruptly to focus on a new language in case of a peer group change. This perspective may help offer some explanation for the widely observed fact that people tend to speak best the language that their primary peers spoke during childhood, even in the face of considerable pressure from parents and others to speak a home language instead (Veltman, 1983).

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Preschool children's grouping: The role of social context

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Introduction. During preschool age, children make their social experience mainly in two contexts, family and class (Hinde, 1974; 1987). Within the class, children, while playing or making activities, compose different kinds of groups (single, dyads, triads, or large groups). Although the group issue has been considered critical at older ages e.g. during adolescence, ethological studies (Strayer & Santos, 1996; McGrew, 1972; Barbu, 2003) have underlined that the group is a core theme since early ages. However, relatively few empirical data have been collected on preschool grouping within the class. The goal of this research is to describe the types of groups built by preschool children in the naturalistic setting of the class. In particular, our study aimed at understanding whether the kind of situation (child led vs teacher led) affects the number of participants per group, the size of the group and the affiliation in the group according to gender. **Method.** Participants Data were collected in 6 Italian preschool settings homogeneous for the age

of the children, from the end of the second year (mean age 4.5) to the end of the third school year (mean age 5.5). The mean number of pupils per class was 21 with a range of 18-27 pupils for each class. Instruments The mapping methodology, developed by Peter Kutnick (Kutnick, Blatchford, & Baines, 2002) was used to obtain, as a snapshot, a map of the groups present in the class. The kind of situation (child vs teacher led), the number of participants in each group, the size of the group (child alone, dyad, small group, 3-5 children, large group, 6-23 children) and the affiliation in the group according to gender (same vs mixed) were noted. A total of 77 mappings were collected with 515 groups: 133 teacher-led and 382 child-led. For gender analysis, 387 groups were taken into account (202 of same gender and 197 of mixed gender), because single groups (child alone) were not considered. Results and discussion. To assess whether the kind of situation (child vs teacher led) affects the number of participants in the groups an Independent T-test was run. The results showed that groups were larger in the teacher led (mean 6.7) than in the child led situation (mean 2.6) [$t(513)=8.7$, $p<.001$]. To provide a more detailed picture of the group size in child vs teacher led situation, Chi square tests were performed. A significant difference was found between the teacher led and the child led situation [$\text{Chi square}(3, N=515) = 122.8$, $p<0.01$]. Standardized residuals indicated that in the teacher led situation large groups were more frequent, while dyads and solitary groups were less frequent in comparison with the child led situation. To investigate whether the kind of situation (child vs teacher led) affects the affiliation according to gender (same, mixed) in groups of different size (dyads, small and large groups), Chi square analyses were run separately on teacher and child led situation, showing significant differences both in teacher [$\text{Chi square}(2, N=268) = 13.2$, $p=0.001$] and in child led situation, [$\text{Chi square}(2, N=119) = 50.8$, $p<0.01$]. In both situations, dyads were more frequently mixed-gender. Moreover, in teacher led situation large groups were more frequently mixed-gender. The results showed that when teachers lead the children's social experience large groups with mixed gender are formed more frequently. By contrast, when children lead their social experience, they make smaller groups (solitary and dyads), frequently with peers of the same gender. Therefore, the context (teacher vs child led) should be taken into account in order to fully understand children's social experience in school grouping.

Concordance for age at menarche in twins reared apart and together

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Menarche is a key developmental event in the lives of young females. The current median age of menarche in developed nations is 12.43 years, a figure that has remained constant over the last fifty years; the mean age at menarche is 12.70 years. Genetic and family environmental effects on menarcheal timing are examined in the first formal study using pairs of twins who were reared apart and reared together. The study included four twins groups: monozygotic (MZA, MZT) and dizygotic (DZA, DZT). Participants were drawn from the Minnesota Study of Twins Reared Apart at the University of Minnesota and from another study of twins, also conducted at the University of Minnesota. In these studies, the zygosity of the same-sex pairs was assigned by serological analysis (performed at the Minneapolis War Memorial Blood Bank), in conjunction with comparisons of dermatoglyphic characteristics and anthropometric measurements. This combined method has

a probability of misclassification of less than .001. The final sample included 27 MZA pairs, 21 DZA pairs, 33 MZT pairs and 14 DZT pairs. All participants had completed a comprehensive Sexual History Timeline that included a question about age at the first menstrual period. Reliability for age at menarche is high across most studies, ranging from .82 to .96. The mean age at menarche was 12.50 years (SD = 1.67) for the reared apart pairs and 12.86 years (SD = 1.49) for the reared together pairs. Intraclass correlations for age at menarche were .56 for MZA twins, .16 for DZA twins, .70 for MZT twins and .41 for DZT twins. The mean within-pair difference was 1.07 years (SD = 1.04) for MZA twins, 1.67 years (SD = 1.59) for DZA twins, 0.64 years (SD = 0.86) for MZT twins and 1.43 years (SD = 1.34) for DZT twins. These results are consistent with genetic influence, given the higher correlations and smaller within-pair differences for the MZ than DZ twin pairs, regardless of rearing status. However, the lower correlations for the reared apart twins and their larger within-pair differences suggest that age at menarche is partly affected by common rearing environments. Various family environmental influences that have been shown to hasten or delay age at menarche (e.g., unstable family relationships; increased frequency of parental interactions, respectively) were also assessed. However, only two measures (feeling understood by one's father and mother during the growing up years) showed meaningful associations with age at menarche. These findings are considered with reference to current theories of pubertal timing.

Are there different types how to learn walking in early infancy?

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In gross motor development of early human infancy, the upright gait is the crucial skill to be acquired. A huge body of qualitative studies has shown that "motor milestones" appear in a characteristic sequence culminating in walking bipedally. However, besides this typical sequence of motor patterns there exist modified types of succession, by which infants learn to walk without support. Beyond these questions of competence our interest was the performance of upright gait in the early ontogeny. With progressing development, we observed a significant quantitative increase of the amount of time, which infants spend walking while they are awake. On the average the acquirement of the upright gait occurs at 12.3 months (N=111). From this time onwards, during the following seven months walking is subject to a rapid increase in percent of total time observed. By 18 months this increase reaches a maximum at 21%, followed by a period of gradual decrease. Similar to the qualitative development in walking, quantitative analysis reveals three different types of development. All three types reflect the characteristic progress of a rapid increase followed by a slight decrease of walking. But they differ in two important parameters, chronological position of the peak and the maximal rate of time spent in walking. The first type of infants starts to walk with eleven months and reaches the maximal percentage of time spent walking (30 %) four months later (with 15 months). The second type has its starting point by twelve months and the peak occurs five months later (with 17 months) at 22 % of total time. The starting point of the third and last type is by an age of 15 months. The period of development is also five months (with 20 months) at 18 %. It is of particular interest, that the period of development from the starting point to the peak percentage of time spend walking is quite robust in all three types. This means that infants which start to walk late never pick up infants starting earlier. Furthermore

they never reach the same high rate (during the first four years of life) as the other types of infants which start walking with eleven or twelve months. We conclude that the motor and neural developmental processes which underlie the acquisition of a reliable upright gait are determined by a fixed time beginning with the first free steps. We conclude furthermore that, these processes can not be reduced by neural maturing.

Poster Session

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Study of dermatoglyphics characteristics of the iranian kurdish resident in north khorasan

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Introduction: At present time , anthropology is divided into two main branches: Cultural and biological anthropology. Cultural anthropology considers the life style and manner of people but biological anthropology studies physical characteristics, similar dermatoglyphics, skeleton, blood groups, ... Although some studies concerning to dermatoglyphics of some races (Tur komans, Negros) or religious groups (Zoroastrians) have been carried out in Iran, but apparently no research has been done about Iranian Kurds yet. Kurds are primarily concentrated in Turkey, Iraq, Iran but Kurdish communities are also found in Syria and the former Soviet Union. The origin of the Kurds has been a source of controversy and uncertainty. Modern – day Kurds trace their origin to the Medes, an Indo – European tribe that descended from Central Asia into the Iranian plateau around 614 B.C. They ruled the area until 550 B.C. as one of the principal pre – Islamic Iranian dynasties. The Medes fought with a host of other tribes, including the Persians, who later defeated them and became the rulers of Iran. The Kurds along with the Persians, the Baluchis, the Tadjiks and the Afghans then constituted the Iranian people. After the Arab defeat of Iranian forces and conquest of the area in the seventh century, outsiders increasingly used the (Kurd) to refer to all people inhabiting the Zagros mountain ranges of northwestern Iran. The Kurds that are resident in North of Khorasan province include different tribes such as Isanlou, Ghahramanlou, Bichranlou, ... Dermatoglyphics (Finger print) is used not only in judicial, criminal, medical researches but is also applicable in ethnology. Methodology: In this research we selected 30 Kurds including Veranlou , Ghahramanlou, Amiranlou, Bichranlou tribes and recorded their palmer ridges. For recording , we use of print ink. Some ink is spread evenly on a glassy plate and palms are impregnated with ink and are placed on a paper of sheet that is located on a cylinder and is pushed forward slowly. We could find triradioses (a,b,c,d) at the base of fingers on paper. We joint a point to b and draw a-b line. We count the ridges on a-b line by lens. Discussion : a-b ridge count is in Veranlou tribe (78.88 in males and 81.23 in females) and in Ghahramanlou (67.32 in males and

67.18 in females) and in Amiranlou (67.4 in males and 63.5 in females) and in Bichranlou (63.5 in males and 67.28 in females) Result: In a comparative study we conclude that there is a significant difference between the Kurdish a-b count ridge with other Iranian populations.

Food sharing as a contributor to heterosexual attraction, mate access and bonding: Preliminaries to ethological observation

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Food sharing is a common and widespread human behavior that can seem difficult to explain and can serve a variety of purposes, but which seems likely to be used on some occasions in the formation and maintenance of heterosexual attraction. Does food sharing serve as a means of soliciting mates, increasing intimacy in couples, or maintaining a close relationship in modern society? There is surprisingly little research addressing this question. For example, Marlowe (2004) notes that “there has been little or no investigation of the motivation and decision-making involved” in human food sharing. Moreover, while various researchers have made some important distinctions between different types and functions of food sharing, these have not been integrated to form a behavioral taxonomy; a prerequisite for creating a useful model of food sharing as it relates to attraction and bonding. This poster will display two taxonomies of food sharing behaviors, outline evolutionary perspectives on food sharing as a component of sexual attraction and bonding, and give an overview of the procedures being used in an ongoing observational study of heterosexual dyads engaged in eating in restaurants and other public places. Approaches to creating a taxonomy of food sharing behaviors include [1] behavioral (e.g., feeding versus tolerated scrounging), and [2] motivational (e.g., signaling; reciprocity; nepotism), and [3] relational (e.g., reciprocal exchange versus unilateral transfer). This poster will present motivational and relational taxonomies of food sharing, and discuss attraction and bonding in light of these distinctions. It will also highlight behavioral variants like mutual feeding that are believed to be the types of behavior most likely involved with attraction. While it is expected that both men and women will share food in order to attract or bond with a potential mate, sex differences in human food sharing are to be expected. From an evolutionary perspective, tolerated theft (scrounging) is but one of several evolutionary models suggesting that sex differences are likely to be observed in food sharing behaviors. Several scholars (e.g., Marlowe, 2004) have highlighted males’ use of surplus food in “costly signalling”. This mechanism proposes that men who can share their food with other group members may thereby increase their access to women. Moreover, because the costly signalling system of asymmetrical or unreciprocated food sharing benefits the audience, it should be an informational display of high “broadcast effectiveness” (Hawkes & Bird, 2002). Additionally, as Lovejoy (1981) argued, male provisioning of a mate can increase her reproductive success by improving her physical condition which, in turn, can shorten birth intervals and increase the likelihood of survival.

Monozygotic-dizygotic-virtual twin analysis of tacit coordination

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Explanations for why some partners can reach mutual goals more successfully than others has been of interest to researchers from diverse disciplines. Recently, some researchers have begun to assess evolutionary-based hypotheses and questions by observing the behaviors of genetically informative participants in experimental game situations. For example, MZ twins showed greater cooperation in a Prisoners Dilemma game, relative to DZ twins (Segal & Hershberger, 1999), and MZ twins showed greater similarity in responses to offer in an Ultimatum game (Wallace et al., 2007). The present study was undertaken to determine if tacit coordination varies as a function of the genetic relatedness of the partners. Tacit coordination refers to circumstances in which “two parties have identical interests and face the problem not of reconciling interests but only of coordinating their actions for their mutual benefit when communication is impossible” (Schelling, 1960, p. 54). Participants included 53 monozygotic (MZ) twin pairs, 85 dizygotic (DZ) twin pairs, and 42 virtual twin (VT) pairs. VT pairs are dyads composed of same-age unrelated children; as such they may include two adoptees or one adoptee and one biological child. (For additional details about virtual twins, see Segal, 2007). Twins ranged between 7 to 13 years of age. Participants were identified via the Fullerton Virtual Twin Study and TAPS (Twins, Adoptees, Peers and Siblings), a collaborative project between California State University, Fullerton and the University of San Francisco. Each twin responded to a series of questions under two separate sets of conditions: individual and coordination. As expected, MZ co-twins showed significantly greater overall agreement than both DZ co-twins and VT co-twins, using two scoring schemes (broad match and exact match). Pair gender was unrelated to the observed outcomes. The implications of these findings are considered with respect to mechanisms underlying the social relatedness between partners. Relevant theoretical perspectives include behavioral-genetic and evolutionary psychology.

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Occupational ethology: A new perspective in occupational stress research

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The research on stress at work is well established. Sociological concepts on how these stressors operate in relation to physiological consequences have been documented extensively. Current knowledge on stressful working conditions results mostly from analyzing surveys completed by employees. Physiological results on endocrine mediators or on perceived stressors are achieved using experimental paradigms or clinical check ups. The theoretical background of the new concept of Occupational Ethology (OE) integrates the fields of evolutionary anthropology, sociology, and physiological stress research. It claims that the environment of evolutionary adaptation during the Pleistocene forced human social behavior to evolve into hierarchical systems. OE proposes that whenever the working process in modern societies does not provide adequate environments on evolutionary evolved social skills such as cooperation, direct and indirect reciprocity, punishment of non-reciprocators among co-working employees, psychological and physiological stress symptoms ensue. An evolutionary approach on behavioral interactions between contemporary employees within hierarchical systems and their effects on individual health may be essential for the understanding of occupationally perceived stress.

Male life history, the operational sex ratio, and variability in marital rates

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Without an understanding of human reproductive roles and strategies, one might expect that if there are a greater number of unmarried persons of one sex, the other sex will have a relatively higher marriage rate because of the availability of partners. However, several decades of research have demonstrated that high operational sex ratios (single men outnumbering single women) are actually associated with higher marriage rates. Where there is a relative shortage of males, males may increase mating effort and decrease relationship commitment. There will be reduced competition among men for relationship commitment and paternal investment; females are less able to be “choosy” and competition among females (in terms of markers of reproductive value) intensifies. Marriages are destabilized because women are less able to select “good” men and men would have little incentive to extend themselves in ways that are highly valued by women. We used a life history framework to clarify the relationship between the operational sex ratio (OSR) and the proportion of men who are married across adulthood. Previous studies documenting the correspondence between high sex ratios and higher male marriage rates did not differentiate among age groups. In modern Western nations, male life history effort shifts from mating effort to parental effort across adulthood, as indicated by fertility patterns, mortality rates from risky behaviors, and androgen levels. Also, in areas where male commitment and paternal investment are relatively lower, cues of potential genetic benefits may be especially important and women have a stronger preference for males with observable characteristics signaling high genetic fitness, especially for short-term relationships. The ability to signal phenotypic quality may decline as men age, due to the observable physiological correlates of senescence. Among Ache foragers, younger men were

usually the fathers of offspring from extra-pair sexual affairs, whereas older men tended to produce most of their offspring within long-term relationships. We predicted that more women than men would be married at younger ages, but women would be less likely to be married than men in later adulthood, reflecting age related trends in male and female reproductive values. We predicted that men would use scarcity in a low sex ratio population to their advantage differentially by age, withholding from marriage while young but facilitating marriage in older ages. Recently, both high and low sex ratios have been noted in large North American cities, mostly due to economic migration. We tested our hypotheses with 2000 U.S. Census data for the ten largest cities in the United States. The OSR for individuals ages 18 to 64 ranged from 92 in Philadelphia to 112 in Phoenix. Across these populations, the proportion of women and men who were unmarried followed a second degree polynomial (inverted U-shaped) curve, with higher values in younger age groups. The male curve lagged the female curve, with a later and lower bottom. Women were more likely to be married than men from age 18 to 44; men were more likely to be married than women at age 45 and above. A maximum of 61.5% of women were married in the 35 to 44 year age group, a maximum of 73.1% of men were married in the 60 to 64 year age group. The OSR was directly related to the proportion of men who were married in early adulthood (ages 20 through 29), but inversely related to the proportion of men who were married for age groups 30 to 34 and above. These relationships were significant at the $\alpha = .001$ level, except for the non-significant correlation in the 18-19 year age group, when fewer than 3% of men were married. Results were consistent with our life history model and a population pattern of serial polygyny.

Body movement and human recognition of Sensation Seeking

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Sensation seeking is a personality trait that is closely associated with risk taking behaviour. For both men and women it is of utmost importance to assess the sensation seeking tendency in social partners, since it allows to evaluate the escalation potential of an interaction. We demonstrated (Atzmüller 2001) that nonverbal behaviour in human conveys information about the personality trait sensation seeking by training neural networks on the recognition of sensation seeking from body motion. The aim of the present study was to find out whether humans are able to decode this information, thus assessing risk taking on the basis of observing body movements. This ability could play a role in male-male competition and female mate choice. The second question was how sensation seeking may be transmitted and transliterated in human behaviour.

We videotaped young males' body movements (N=250) while they performed a pantomime. The participants were asked to fill in Zuckerman's "Sensation Seeking Scale Form V" (SSS V). For the present investigation we used a subsample of 25 participants. They were selected by a linear gradation of the sensation seeking value, starting with the lowest Sensation Seeker in the sample and ending with the person who had the highest SSS V – score. These selected films were adapted with "quantized displays", which excluded non-behavioural sources of information like hairstyle or clothing, so that only the information carried in body movement remained. 267 subjects were asked to watch these films and assess the sensation seeking tendency. The questionnaire was

adapted for third party observers without shifting its contents. The observers were recruited from different internet forums and accomplished the evaluation online.

First, with a reliability analysis we measured whether the observers show agreement in the perception of the readiness to assume risk of the moving persons. Except for few cases, a high concordance was shown with high Cronbach's alpha values.

Secondly, the third-party sensation-seeking-evaluations were compared with observed people's self-evaluations. In spite of the high inter-observer agreement no significant correlation was found. In male observers there was no correlation between self- and other rating. In females, only the sensation seeking subscale "boredom susceptibility" showed a low correlation with self-evaluation. In the reproductive age of 16 to 40 years, this effect becomes even more pronounced. All other subscales of sensation seeking did not show a connection between foreign and self-evaluation. Age did not affect the relation in male observers.

In order to find out how sensation seeking is encoded in nonverbal human behavior, the body movement sequences were analysed by dint of "e-motion" and "expression", software designed for the qualitative analysis of human body movement. It was shown that only the qualitative motion parameter "speed" was used to evaluate sensation seeking by observers of body motion. In female observers the parameter speed is significantly correlated with the SSS V – total score and all four subscale-scores of third-party evaluation of sensation seeking. In males, the only significant coefficients were found for the subscale boredom susceptibility and the SSS V – total score.

The speed of body movement seems to be a very important trait for evaluating a persons motion. But it also seems that appraising sensation seeking is not as relevant in male-male competition and female mate choice as expected. Only "boredom susceptibility" was assessed accurately by female observers in the reproductive age of 16 to 40 years.

Darwin and Forensic Psychiatry: Are psychopaths criminally responsible?

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Forensic psychiatrists are called upon to evaluate the criminal responsibility of mentally disordered offenders. At times, this task can be quite difficult due to a blurred border between scientific evidence and normative (moral) judgment. This dilemma becomes exceedingly evident in the evaluation of individuals with psychopathy who show a diminished capacity for remorse, poor behavioral controls and a consistent pattern of antisocial, criminal and violent behavior. Besides neuroscience and behavior genetics, evolutionary psychology tries to explain psychopathy and delinquent behavior. Can evolutionary psychology help to clarify the psychological underpinnings of criminal responsibility? To explore this question, I start from the classic theory of Linda Mealey, who saw psychopathy as a – partly optional, partly hard-wired – "evolutionary stable strategy". In this context, psychopathy is selected for by frequency-dependent selection for its reproductive advantage under certain conditions. At this point, evolutionary analysis underscores the paradox, already present in the medical and neurobiological account of psychopathy:

severe psychopathological symptoms (lack of empathy, impulsivity) are described and explained (neuro)biologically, but the consequences for criminal responsibility are seen quite different to the consequences of, e.g. a cerebral tumor or of an intoxication. The psychopath is usually considered fully responsible for his or her transgressions. This paradox has some connection to the difficulty of the forensic psychiatrist to evaluate the criminal responsibility of a psychopath without referring to normative decision. This “normative gap“ cannot be bridged by a consequentialist concept of punishment. However, the reason for this gap becomes clearer, when, instead of further investigation of the defendant, one looks at the psychological mechanisms underlying punishment. These mechanisms also underlie our culturally mediated forensic institutions. They are implicitly applied by judges and juries, expert witnesses, and the defendants themselves. The psychology of the perpetrator and the psychology of the punisher must be seen as co-evolved. Empirical investigations from experimental economics and from social psychology, both inspired by an evolutionary perspective, have recently shown that not only the disposition for antisocial behavior but also the readiness to punish has evolutionary roots. In particular, third-party punishment has shown to be psychological adaptation necessary for the propagation of cooperation. Emotionally-driven punitive intuitions motivate retributive punishment and seem to be more important for the justification of sanctions than rational reasoning. These findings confirm that antisocial behavior, punitiveness – and probably moral emotions including shame and guilt – have coevolved. The combined analysis of the psychobiological foundations of delinquency and punishment reveals our motives for the differentiation of “normal“ delinquency from mentally disordered offenders. It also shows why psychopaths, who prototypically display the behavior, that our punitive intuitions evolved to curb, are usually perceived as criminally responsible. Even then, however, evolutionary psychology cannot give normative guidance. The dilemmas remain, but with a more complete understanding of their background, we are better prepared to cope with them.

Jewish dietary rules: A human ethological synopsis

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In Jewish culture we find a particular persistence and strictness of dietary laws, which are based on divine commandments, but partially transcend them. Up to now the Halakhic food taboos were mostly investigated from a cultural or social anthropological perspective. Far reaching is the structural approach of the British anthropologist Mary Douglas in her *Purity and Danger* (1966), where she traces back the strict rules to imaginations of purity and pollution (kosher and trefe). This dichotomy is structuring Jewish life and is based on a conception of correct arrangement and the avoidance of hybrids, as they endanger purity. Frederick Simoons (1961) and other functionalists see strict purity rules as a mechanism to distinguish the own group from others. Simoons refers to the begin of the dietary laws: the exodus of Israel out of Egypt, a symbol for the long periods of diaspora in Jewish history when Mosaic religion and culture had to stand up to their surrounding. Which approach can Human Ethology offer to further the understanding of Jewish dietary rules? One finds sophisticated habits of nutrition in all cultures, which are not explainable by the available spectrum of resources alone. Often the spurned aliments (primarily animal products) are

associatively connected to disgust, especially if they are used as food in bordering ethnic groups. To my knowledge there are two evolutionary biological lines of reasoning to address this problem. First, we can interpret the narrowing of the spectrum of resources as a specialization (in methods of hunting, agriculture and preparing) for different ecological niches, as an evolutionary adaptation to avoid competition. Second, we can detect that shared disgust has an identity-forming function and produces strong social cohesion (comp. Rozin et al. 1997, Schiefenhövel 1997). The materialistic cultural theory of Marvin Harris (1985) focuses on the first explanation. He traces the pork taboo back to a negative cost-benefit calculation for pig husbandry in the Middle East caused by the lack of carbohydrate nutrients and the inexpediency of pigs for Israel's nomadic way of life. This approach may explain why the Jews had no interest in keeping pigs but it does not explain the extreme tabooization of this animal, and a comparable coherent explanation for the other tabooed foods (some birds, fish, amphibians and reptiles) seems impossible. Better suited to explain this type of food taboo seems the hypothesis of cultural evolution involving associated disgust. This can be connected to the theories of Douglas and Simoons. Associative disgust is probably built on the biological disgust reaction to inedible, dangerous matter, like putrefied flesh and faeces. During the process of primary socialisation the variety of things connected to disgust gets more and more enlarged by ones own experiences as well as by social learning, far beyond food and consumable objects. It is an observable phenomenon that nauseating substances are believed to have contaminating qualities. One who eats disgusting things gets disgusting himself ("you are what you eat"). The socio-cultural function of shared disgust reaction is the strengthening of cultural identity by discriminating the outgroup. This thesis is confirmed by the extreme tabooization of pork, which is a deeply symbolic sign marking the difference between pastoralists and settled people. Furthermore the high esteem in which the Maccabean martyrs are held, who in the Hellenic diaspora rather opted to be tortured to death than to eat impure food, fits this view. The specific strictness and persistence of the Jewish dietary rules is probably best explained by the permanent diaspora situation. By creating a strong social bond within the ethnic group it was possible to resist foreign influence and to keep Jewish culture and religion "kosher". A Human Ethological contribution to social phenomena is to point out, that behavioural biology can only make reasonable assumptions about predispositions in human behaviour, but is often not able to proof them for sure. Regarding Jewish dietary rules - as well as similar food restrictions in other cultures - a possible predisposition of humans to ethnocentrism can be detected. The identity-corroborating function of the Halakhic nutrition taboos can also be interpreted in the context of group selection.

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Romantic love and links with love styles, attachment styles and relationship satisfaction in brazilian couples

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This study explores themes links between love-styles, adult attachment and relationship satisfaction in a population of 117 Brazilian heterosexual stable couples. The main goal is verify sex differences and also couples differences or similarities. The subjects completed the following questionnaires: A shortened version of the Love Attitudes Scale (LAS) designed to assess six love styles; the Relationship Questionnaire (RQ) that measures adult romantic attachment; and the measure of perceived Relationship Quality Components. The results indicated no significant differences in men and women's behaviors related to the attachment styles and relationship satisfaction. It was also observed that Eros love style was predominant, followed by Storge and Agape, and Ludus was the most rejected one in this sample, what could be expected based on the high level of commitment and mean age of 28,66 (SD=6,06). Therefore, the intra-couple results showed a tendency to observe an association between Eros and Storge styles traduced by the behavior "Eros mostly got married with Eros" and "Storge mostly got married with Storge". Related to Attachment Styles, the most rejected styles by this population were the Dismissing and Fearful styles, and in the other hand, they described themselves more closely with Secure and Preoccupied styles. According to intra-couples analysis, it was observed a union trend between Secure's men and women, and between Fearful men with Preoccupied women and vice-versa. Consequently, the Dismissing style presented no affinities between itself or with other styles in these couples. Results will be discussed in an evolutionary perspective.

Experimental assessment of the human motivational systems: Validation of the international affective picture system in a chilean sample

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Early in psychology the existence of a dimensional structure of human affectivity was observed, and was organized according to hedonic valence and arousal (Wundt, 1896; Osgood, Suci, Tannebaum, 1957). Throughout time, diverse authors have refined and reformulated this idea, and in the present it is based on a psychological, psychophysiological, and neurobiological perspective, that suggests the presence of two motivational systems responsible for the bi-dimensionality of affective expression (Lang, Bradley & Cuthbert 1990; Lang, 1995). From an evolutionary perspective, this theory sustains the development of diverse emotional responses in our species, based on behavioral strategies of approach and avoidance when the environmental stimuli are appetitive or aversive, respectively. Lang and colleagues (Lang, Bradley & Cuthbert, 1999; Bradley & Lang, 1999) have developed an experimental method for the study of the dimensional affective response, denominated International Affective Picture System (IAPS, Center for the Study of Emotion and Attention [CSEA], 1995). The IAPS consists of standardized pictures of a wide affective spectrum, which represent a diversity of situations from human and animal life. The images have been rated according to the dimensions of hedonic valence, arousal and dominance, and the results have proved to be consistent among different cultures (e.g., Verschuere, Crombez, & Koster, 2001;

Molto et al., 1999; Ribeiro, Pompeia, & Amodeo, 2004). In the present study, a validation of a subset of the IAPS images was conducted with a Chilean sample, under the general hypothesis that the evaluation of the stimuli should follow the bi-factorial structure reported in the literature. For that purpose a sample of a 135 undergraduate psychology students was used, whose mean age was 20.13 (DS = 2.9), and which included 35 men. A total of 188 pictures of different thematic content of the IAPS were selected (romance, erotica, family, people, neutral objects, illness), which were presented according to the procedure proposed in the original validation study, and evaluated in affective valence and arousal. The results showed that the mean assigned to each stimulus in both dimensions generates an affective space that adopts the expected boomerang shape. Furthermore, the correlation between valence and arousal for the pictures with a positive and negative valence is, respectively, significant; nevertheless the relationship is notoriously more elevated in the case of negative pictures. Men and women show very similar valence means ($r = .927$; $p < .001$), for that reason no separated sex analysis is reported. Finally, the comparison of ratings obtained in this study with those of the North American population are very similar in valence as well as arousal ($r = .935$; $p < .001$ and $r = .923$; $p < .001$, respectively). However, the mean in arousal in the Chilean sample tend to be slightly superior. These results are discussed in light of the motivational theory, and the observed tendency of the present study is concordant with reports in other contexts. The adopted distribution of the images in the affective space shows that the bi-dimensional affective structure is robust and is conserved among individuals, although cultural variations in the different countries exist. In fact, it is possible to evidence a minor variation in the activation sensitivity of the arousal subsystem reflected on the tendency to give greater ratings in Chile. This is consistent with the prevalent affective cultural stereotype.

Corporal image: Base for resocialization for young in risk

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We understand that children and young that living in streets in Brazil, submitted to the social, economic and affective privation they construct their proper corresponding values and symbols. To look for to understand their behaviors make necessary to appeal the contributions of the ethology. According to Carvalho (1989), the approach of the ethology goes beyond the innate conception. For the interactionist conception of behavior, the concept is basic for the specific environment of specie. In the case of the human being this environment is marked strong by the culture that can be unlinked of the biological evolution since “the culture produced the brain that produces it”. Carvalho (1989), have to recoup the man notion as a bio-psycho-social being. The form is understood for corporal image as an individual perceives and feels in relation to its proper body. But a corporal image sends, in some way, to the direction of the corporal images that circulate in the community and if they construct from the diverse relationships that establishes there, either for the proximity, either for the emotional distance that image provides. Methodology: Qualitative boarding according to Carvalho, Gilbert Duran and Eni Orlandi. Sample: The citizens of the study had been 26 young inhabitants of the streets with ages between 14 and 18 years. During 9 months, had been made weekly playful activities with these young by a Physical Education teacher. Instrument: Used for the collection of the data: half-structuralized interview, composed of 4 questions:

How you see yourself in relation the other young of your group? Which differences between you and young that frequents the school? How you find that these young see you? How would like that its body was? The analysis was made following the perspective of Michel Pêcheux. Results: In the social imaginary of that group detaches the construction of the corporal auto image with felt of without value, abandoned, poor, outlaws and banished of the society. At the same time they emphasize a desired image of body: a pretty, strong, healthful body. In theirs representations, they associated the physical beauty with happiness, money, success and, even though, with goodness and intelligence. The physical beauty appears, also, associate the prominence professions: artist, football player and model. Anyway, they reject those strangers' figures, which move away from the accepted physical standards for the current society. Such question goes to the meeting of social the ethological conception of that the human being is a biologically cultural being and that transforms according their necessities.

Eye contact, gender differences and the laterality of handshake

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It has been hypothesized that eye contact could represent the pleasantness of an interaction. The aim of this study was to analyze the time course of eye contact in an ecological setting under two conditions: a typical meeting ritual (right handshake) and an atypical one (left handshake). A second aim was to investigate possible gender differences. In particular, we analyzed eye contact between the subjects (N=100; 51 females and 49 males; all Caucasian) and an interviewer after a handshake occurring under the pretext of administering a questionnaire. A female experimenter stopped passers-by in the Chieti University campus and required them to complete a questionnaire. The experimenter stared into the subject's eyes from the beginning of the handshake, while describing the task to be administered. A hidden camera recorded the scene, with the experimenter looking in the same direction of the camera. This way, the subjects faced toward the camera and it was possible to film eye contact with the experimenter. The rate of eye contact was subsequently analyzed for the 15 seconds immediately following handshake, and further dividing the overall period into three 5 seconds subperiods. Importantly, the questionnaire administered after the end of the meeting ritual was a lateral preference questionnaire (Salmaso & Longoni, 1985). In the typical condition, with the experimenter offering her right hand for handshake, females and males showed different trends of eye contact over time. While in females eye contact rate decreased significantly from the first to the third subperiod, in males it increased, although not significantly, from the first to the third subperiod. However, neither the rate of eye contact in the overall 15 seconds nor that during any of the three subperiods differed between males and females. When a change in respect to canonical handshake was introduced by letting the experimenter offer her left hand, females and males showed a similar trend of eye contact over time. In fact, in both sexes the rate of eye contact decreased (significantly for females and males) from the first to the second subperiod and increased (significantly for males but not for females) from the second to the third subperiod. Even in this case, however, neither the rate of eye contact in the overall 15 seconds nor that during any of the subperiods differed between males and females. In females, the hand (right or left) offered for handshake did not exert significant effects on eye contact rate neither in

the overall 15 seconds nor in any of the three subperiods. In males, the hand offered for handshake had a significant effect on eye contact rate in the second subperiod, with males in the right handshake condition staring longer into experimenter's eyes. Considering all the subjects, the left handshake decreased significantly eye contact rate both in the overall 15 seconds and in the second subperiod. The interaction between handshake side and subjects' score in the questionnaire did not show effects on eye contact rate. Subjects with a high laterality score (i.e., more right-handed) judged the questionnaire as being more annoying (as evaluated by additional items measuring the level of interest in taking part to the interview) than the subjects with a low laterality score (i.e., less right-handed). However, these judgments were not influenced by handshake side. Our results suggest that introducing an unexpected change in a well-established social situation can influence the quality of the interaction, and this effect may implicitly manifest itself as a variation in the usual pattern of eye contact. Our hypothesis is that the decrease in eye contact rate in the second subperiod in the left handshake condition could represent a measure of embarrassment or discomfort due to the violation of a well-known social rule (i.e., that right hand is used for handshake). This effect seems not to be present in the first 5 seconds from handshake and not to persist beyond 10 seconds after that, as well as it seems not to influence the positivity of explicit subsequent judgments on the task administered. The handshake condition effect did not appear to be affected by subjects' laterality score, so we conclude that the influence of hand used by the experimenter is due simply to the existence of a well-known social rule, and not to a possible prejudice against left-handers. Instead, males with a high laterality score judged the questionnaire more negatively, and this could represent a prejudice towards left-handers on the part of the more right-handed males.

Ear preference in communication: observational and quasi-experimental investigations in discotheques

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Many laboratory studies, and particularly those employing the dichotic listening method, have shown a right ear advantage in several linguistic and non-linguistic tasks. Here we will report the results of an observational study on spontaneous ear preference during verbal interactions in a noisy environment and those of a quasi-experimental study in which an experimenter made a request speaking in the left or right ear of subjects. In the first study, spontaneous ear preference (a listener's proneness to orient her/his head laterally offering the left or the right ear to a speaker during a linguistic exchange) was studied in an ecological condition (i.e. in discotheques) in which environmental noise is such that lateralized coordination is obligatory. Observations were carried out of one hundred and forty-three verbal interactions, with the constraint that the participants faced each other frontally before the start of the interaction. Results showed that the listeners used their right more than their left ear, in a 5R : 2L ratio. When data were analyzed according to the sex of speaker and listener, males displayed a 2R : 1L ratio, whereas females displayed a 3R : 1L ratio. These results could be an ecological illustration of sensory-motor lateralization during social coordination, representing a behavioural consequence of the left-hemispheric specialization

for language processing. In the second study, we investigated the possible effects of manipulating the ear in which a request was made. For this purpose, a female experimenter asked for a cigarette in the right or left ear of male and female subjects, with the constraint that she faced the participants before the request. Our preliminary data consist of around two hundred cases, and indicate that the female experimenter, unsurprisingly, obtained significantly more cigarettes when the request was made to males than to females. The experimenter obtained more cigarettes when she spoke to the subjects' right ear compared to the subjects' left ear, but this difference did not reach significance. However, when data were analyzed according to the sex of subject and the ear used, we found an interesting effect: the frequency of cigarettes obtained was identical when the request was made in either the right or left ear of males and in the right ear of females, but it was significantly lower when the request was made in the left ear of females. If we assume that the request of a cigarette by a female may be more annoying for females than for males, our data can be interpreted as the consequence of the right-hemisphere specialization for emotional processing. Alternatively, the same assumption on gender differences could be in agreement with the more controversial theory on the differential specialization of right and left hemispheres respectively for negative and positive emotions.

Religion and reproductive success: Some conjecture

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There are many examples of groups of cooperating individuals which contain a non-breeding sub-group. Examples exist among the insects (Darwin, "The Origin of Species," discusses neuter and sterile insects); human religious groups having that property provide other examples. In any particular case, over time, a breeding group supplies members to a non-breeding group. Assuming that selection falls on the reproducing individuals, how in the human case is the formation and persistence of such groups explained? Choose any living, human individual. Choose a parent of the individual. Choose a parent of the parent. Continue the process for 1,000 million years. Imagine the individuals in the line of ancestry to be displayed in the order of their appearance, with the earliest ancestor on the left. Now imagine that above each individual there is a box in which the theory for its behaviour is displayed. (In a work in progress, "Formal Ethology: A Route to Generality in the Study of Behaviour," I have constructed a formal characterization of the notion "ethological theory (or explanation) for behaviour.") The behaviour of individuals adjacent in the line would vary little—hence the form of the theories for their behaviour would vary little. (In a litter of kittens individual physical differences and differences of temperament can be observed, but the behaviour of each kitten is in general cat-like, and closely similar to that of the parent cats.) In the line of ancestry of any individual there are no species boundaries—there is "behavioural continuity." (Compare Darwin, "The Origin of Species": "that the canon of natural history of "Natura non facit saltum," is applicable to instincts as well as to corporeal structure,") Living things evolve in groups. In particular, where a system of cooperation exists, from the point of view of behavioural evolution, the selection leading to it would have to have fallen on the behavioural structure of every breeding individual in the lines of ancestry of the members of the present group. I conjecture that for a non-breeding sub-group to persist, the breeding group must repeatedly produce genotypes from which, under social influence, the required ethotypes ("behavioural structures") would

be developed. I discuss the part played by universally significant signs, such as those explored by Darwin and Eibl-Eibesfeldt, in what I have called, "social influence." I discuss the form and dynamics of ethotypes in terms of functional cycles, role, status, value, and goals. I conclude that the group is the "evolutionary unit," that the cooperating group achieves in aggregate the reproductive success needed for its continued existence. (Darwin, "The Origin of Species," discusses selection in nonhuman cases "applied to the family, as well as to the individual." His discussion of bee stings and drones is also pertinent.)

Phytophilia: Effects of plants on human cognition and room perception

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Phytophilia: Effects of plants on human cognition and room perception Marlene Mann, Elisabeth Oberzaucher, Karl Grammer Ludwig Boltzmann-Institute for Urban Ethology Department of Anthropology, University of Vienna Althanstraße 14 1090 Vienna, Austria, Europe E-Mail: marlenemann@gmx.at Foliage plants are assumed to have positive effects on our body, health and psyche through their mere presence. This effect could be due to human evolutionary past, which took place in the savannas of tropical Africa where green plants were of crucial importance for several reasons: They were food resources themselves and indicators for prey and water. This ecological relevance shaped the human perception and brain functioning. Therefore modern humans still have a predisposition for plants, called phytophilia (Ulrich 1983), which can be observed in positive emotional and physiological responses to natural environments. The human brain can better cope with natural than urban environments and therefore it needs less capacity in natural surroundings (Wohlwill 1983). Additionally, foliage plants can reduce stress in the viewer (Kaplan & Kaplan 1989, Ulrich et al. 1991) and in this way release the cognitive apparatus. Positive effects of the presence of plants on human cognition could be shown in some studies. Shibata and Suzuki (2002) found out that men with a plant in front of them were better in a creative word-association-test than men without plants. Lohr et al. (1996) could show that reaction time is improved in rooms with plants, while error rate was not affected. Oberzaucher & Grammer (2001) showed that examinees of the theoretical driving license test are positively influenced by green plants positioned next to their computer monitors; i.e. examinees with plants in the room performed much faster and more effectively than examinees without plants. Furthermore, these examinees rated the working climate in rooms with plants better. The present study aims to identify the characteristics of plants that lead to this effect on cognition. Again, our dependent variable were the test results of examinees of the theoretical driving license test. Additionally we collected saliva samples of the examinees shortly before and after the test for measuring cortisol as a physiological indicator for stress. After the test the examinees were asked to fill out a questionnaire about their perception of the room and the experimental setup and their current feelings. We compared three different conditions: (1) natural plants, (2) artificial plants or (3) green model cars as a non-plant-stimulus positioned next to the computer screens. Since it has been demonstrated that positive effects can be generated by merely watching natural environments, no difference between artificial and natural plants is to be expected. In this study we show that plants influence the perception of the

surroundings positively. The term room climate is rated significantly better, when there were natural or artificial plants in the room. There is no evidence for a positive influence of foliage plants on the performance in the driving test, or on the cortisol levels.

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Different behavioural markers in the smile of enjoyment

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The so called “enjoyment smile” described by Ekman and Friesen (1982) is considered expression of many positive emotions (such as, happiness, Joy, Amusement...) and different interpersonal attitudes (such as cordiality, friendliness...). Despite the fact that smiling has so many meanings, it has been described as an unitary behavioural pattern given by the combination of two action units (AUs 12+6 according to FACS, proposed by Ekman & Friesen, 1978); other AUs may be considered to describe the different facial expressions belonging to the enjoyment family. In our previous studies we analysed two other types of smile: a sensory pleasure smile (expressed

by the combination of AUs 12+6+43) and an elation smile (expressed by the combination of AUs 12+6+5). In this study we tried to analyse the role of other expressive components that can appear in combination with the basic smile expression (AUs 12+6). The results of our study showed that different degrees of mouth opening (AUs 25 and 26), eyes opening (AU 5) and eyes constriction (AU 7) in combination with a wide opened mouth can all be regarded as predictive of genuine emotional smiles and of specific emotional variations.

Examination cheating amongst undergraduates

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Cheating behavior, defined as copying answers from the paper of a colleague with consent while taking an examination, was studied among Brazilian undergraduates. The cheater generally can be considered a parasite who gets higher marks than he deserves, leading to an inaccurate evaluation of knowledge. Objective: Investigate the influence of the costs of cheating on students opinions and self-reported frequency of cheating. Method: Participants were 239 undergraduates (147 in Engineering and 82 in Chemistry, control group) from two public Brazilian Universities, both located in the same state. All students were in the first two years of undergraduation courses. Engineering students were in two groups. The first one, referred to as Previous Choice Engineering (PCE), was composed of 77 undergraduates from State University of Campinas (48 men 29 women), which entered the desired field (e.g. electrical engineering, mechanical engineering or naval engineering) chosen by examination; and the second referred to as Late Choice Engineering (LCE), was composed of 70 undergraduates from University of São Paulo (54 men and 16 women), which whose grades during the two first college years give them preference to choose the field. To gauge students' opinions and behavior toward cheating, a 12-item Cheating Questionnaire was developed. The first item asked respondents' opinion about cheating (favorable, against or indifferent) and on subsequent items cheating was rated on 5-point Likert scales. Results: The ratings of the items of the Cheating Questionnaire on 5-point Likert scales were analyzed using a Factor Analysis. Four varimax rotated factors were extracted. The first factor called "Frequency of cheating" accounted for 24.5% of the total variance, the second factor called "Risk/anxiety" accounted for 17.9% of the total variance, the third factor called "Negative consequences" accounted for 14.4% of the total variance, and the fourth factor called "Friendship" accounted for 12.6% of the total variance. The variables of the factors were used as dependent variables in a Multivariate General Linear Model (M-GLM). A significant effect of Group (PCE, LCE, UNI-C, USP-C) was found on the four items of the first factor "Frequency of cheating" (Wilks' lambda = .702, F_{12,638} = 6.744, p < 0.001, observed power = 1.000). Subsequent post-hoc tests revealed that, in accordance with the favorable attitudes toward cheating, PCE students reported that colleagues gave them more frequently answers on exams than LCE students, and that chemistry students fell in between. Furthermore PCE students reported that they asked their colleagues more for answers and that the colleagues asked them more for answers than the other groups. Conclusion: We suppose that in a context of high competition (LCE), the students helped their peers less than in a

context of low competition (PCE). But it is important to consider that the demand was also less intense in the low competition context. Apparently there is a well established knowledge of the social network which would guarantee predictability. Although there is no explicit honor code influencing the cheating behavior, the students seemed to follow an implicit social agreement. The students seemed to have a tuning concerning the issues of giving and receiving illegal help on the exams and the groups' social values.

Shifts in colour discrimination and food imagery preferences during the first trimester

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Objective. We are testing the functional theory of pregnancy sickness by investigating possible shifts in chromatic discrimination and food imagery preferences in women during their first trimester of pregnancy. We hypothesized that colour discrimination and food imagery preference shifts support an evolutionary view of pregnancy sickness as a system of physiological and psychological changes that serve to protect the embryo from food-based toxins. These physiological and psychological changes include food aversions, nausea, vomiting, dry heaves, increased olfactory sensitivity and increased taste sensitivity. Changes in visual sensitivity in the first trimester have not been investigated thus far. **Methods.** We intend to test 25 first trimester women and 25 nonpregnant controls. Subjects complete two tests. The first is the Farnsworth-Munsell 100 (FM100) hue test, a test of detailed colour discrimination. The task for the subject is to order a total of 85 colored caps in order of hue (to form a regular color series). The second is a visual preference test of 10 common food exemplars (apple, banana, broccoli, mushroom, lettuce, papaya, pear, raspberry, steak, and tomato). Each slide displays a high resolution image of one type of food at 6 different stages of ripeness or freshness. Subjects rate how appetizing they find each food image on a scale of 1 to 7. **Results.** Currently, we have tested 4 pregnant women and 8 nonpregnant women (we intend to test 50 subjects). The FM100 test was analyzed using an independent groups t-test and the visual preference test was analyzed as a 2 (participant status) x 5(stage of food) ANOVAs with appetizing rating as the dependent variable. Preliminary results show a trend consistent with our first prediction that first trimester subjects have better chromatic discrimination when compared with non-pregnant subjects () (note: lower scores mean better colour discrimination). Our second prediction also appears to be consistent with our prediction of lower palatability ratings for first trimester subjects compared to controls. **Conclusion.** These preliminary results appear to support our two hypotheses and, thereby, lend some empirical evidence to the evolutionary-based toxin avoidance theory of pregnancy sickness.

Are family special? An fMRI study into human kin recognition

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Hamilton's kin selection theory proposed that animals that are closely related behave altruistically towards each other as a mechanism for enhancing the survival of the genes. Kin-biased behaviour can be costly in terms of taking actions to benefit another, so it is predicted that a kin discrimination mechanism should have been selected for. Facial self-resemblance has been proposed as a mechanism for kin recognition but the neurobiological correlates for this have not yet been identified. Using fMRI on 12 healthy humans, we conducted 2 experiments: the first exploring the neural activation in response to the self-face versus faces of kin versus faces of friends; the second examining the degree to which the morphed self-face activated the same neural substrates as those when viewing faces of kin. Greater activation was generated in regions associated with self-face recognition when contrasting faces of kin with faces of distracters but other regions, such as the posterior cingulate and cuneus, were active when contrasting faces of kin with faces of friends. Contrasting morphs of self-resembling faces with morphs of kin faces again activated posterior medial substrates. This may mean that facial familiarity is used in kin recognition. Faces of kin and self-resembling faces when contrasted with the self-face both activated the medial frontal gyrus (and the former contrast also activated the right insula). These data suggest that a combination of discriminative neural processes such as face processing and person knowledge is recruited to distinguish kin and self-resembling faces from faces of non-kin.

Theory versus reality in the behavioral sciences

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Theory and reality often do not match in human behavior. While masquerading as science, many theories limit our predictive skill and restrict available technologies. Psychodynamic theories restrict psychotherapeutic options, just as many religions forbid doubt. Political ideologies promote half-truths that prevent inter-group cooperation by concealing common interests. Two questions address this mis-match between theory and reality. One, what functions do psychosocial theories actually serve? Two, why do they purport to be more objective than they really are? In addition to information management, psychosocial theory serves two primary social functions. One, is affiliation into a fellowship of common believers. Two, practitioners' behaviors become grounded in social consensus, protecting others from selfish manipulation. But why, then, does psychosocial theory so often pretend to be more substantive than it really is? This mis-match is a clue that we humans are not what we think. Evidence converges toward a new hypothesis: that our minds evolved from shared self-deceptions that promote in-group cooperation where interests otherwise conflict. Within punishing systems of indirect reciprocity, two or more individuals unwittingly grant one another wiggle room for self-interest, conceal this fact through shared self-deception, and enforce this compact through threat of counter-betrayal to group punishment. This binding function creates an emergent interactional structure on which minds and complex culture can co-evolve. Such shared self-deceptions underlie all cognition. Theories can become more objective in two ways. One, when linked to shallowly hidden human universals, such as reciprocity, they become "common psychology." Two, when linked with physical reality, they become falsifiable and are now truly scientific. Four sets of predictions follow. One, otherwise anomalous

data such as whistleblower aversion, deceptive functions of language, and the illusion of conscious will are unified. Two, causation largely proceeds from outward to inward, through social influence. Three, if tested against an informational model, cognition should prove to be sub-optimal by functional measures. Finally, unfalsifiable beliefs can be studied through their behavioral effects on how believers treat others. Examples are offered.

Spontaneous regular 'gait cycles' in motor behavior of neonates

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The investigation of spontaneous movements of neonates has experienced a huge transformation from traditional observation and categorization of e.g. primitive reflexes and general movements [1] to sophisticated methods from nonlinear dynamics, that e.g. describe spontaneous single-limb-activity by chaotic dynamics [2,3] and limit cycles [4]. In former studies, we analyzed the neonatal four-limb-system with methods from nonlinear dynamics, i.e. recurrence plot analysis and symbolic dynamics, and found evidence for processes of self-organization towards a system of transient reference configurations [5,6]. In search for the underlying mechanisms of the emergence of the documented system of four-limb-configurations, we studied limb coordination in human neonates by applying the procedure of gait analysis – definition of movement cycles in reference to recurrent events and normalization to percentages of these cycles - to kinematic data of spontaneous limb movements of human neonates in the supine position. Movement cycles of the limbs were defined by maximal and minimal values of distance trajectories of the hands and feet from the centre of the torso. The procedure of gait analysis was extended to a parallel eight-fold analysis by defining the minimal and maximal values of each of the four limbs as starting events for new cycles, respectively. With the parallel procedure of cycle analysis from maximum-to maximum-event of each limb and minimum- to minimum-event of each limb we obtained eight cycle series. For each cycle of the eight series, the ratio of the second value of the cycle-encoding limb (e.g. minima, if maxima defined the cycle) and the ratios of the minima- and maxima-events of the remaining three limbs were calculated. Cycles in which minima- and maxima-events occurred in integer ratios* to each other in reference to the cycle-encoding event and its cycle duration were termed regular cycles. Special cases of regular cycles were those with synchronous events (100%) and 50% ratios. These ratios are both common in adult gait patterns and can be considered as symmetric cycles. Our results show, that clusters of regular and irregular cycles alternated within the whole movement episodes, with the percentage of regular cycles ranging from 21 to 34% for each of the eight cycle series. This means that altogether, approximately 80% of a movement episode were involved in regular cycles in reference to cycle-encoding minimal or maximal values of at least one of the limbs. In more detail, we show switches between cycle-encoding events: e.g. maxima- and minima-events of the limbs show integer ratios in reference to the maximum of the right hand for 2 cycles and then the system switched to the minima of the left foot governing 3 regular cycles as cycle-encoding events. In other words, regularity was wandering through the system by changing cycle-encoding events. The findings of this work show, that (i) single limb movements, general movements and reflexes were not independent of each other, but

instead were part of a higher level of organization i.e. an itinerant regularity of movement cycles with integer ratios and synchrony, if the movement behaviour was measured in respect to adequate reference points [5,7]. (ii) The acquisition of information about the sensory-motor system is obviously enhanced by the exploration of integer ratios towards switching reference events. (iii) Already in the newborn period, integer ratios – as in later locomotion and gait patterns – were favoured. This points towards integer ratios being effective coordinative relations within the biomechanical and neuronal conditions of the body in interaction with gravity. * refers to: $x/y \mid x,y < 10$ – e.g. 4/7.

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Justine effect: Punishment of too altruistic individuals

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The typical and good described aim of punishment is to defend the group against the social parasitism; under the threat of punishment the individual decides for more social responsible behavior (= behavior leading to the profit of the group at expense of ones own) that one would decide for in the situation of impunity. In the real life we do not seldom observe the phenomenon, when not only the selfish individuals (as expected) but also the, comparing to the standard, too altruistic

individuals are punished. This phenomenon we call “Justine effect”. This term refer to the work of Marquise de Sade Justine – the Misfortunes of Virtue, where the main reason to punish the main character was her charity.

We tried to determine whether this phenomenon can be observed under controlled experimental conditions, too. To monitor the relationship between the extent of punishment imposed from the group on individual and the social responsibility of individual manifested to the group we used experimental game Public Goods Game. In each round each participant of the experiment receives 20 CZK (about 1\$) that he may, after one’s own choice, divide into the public goods and one’s savings. After the first round the experimenters double the public goods and give out a same amount of the money from it to each participant of the game. The experimenters announce the deposit of each participant to the public goods in the first round. And the game goes on. The version of the game “with punishments” allows each participants to impose “punishments”, e.g. to decrease the profit of other participants, but of ones own costs. The experiment went ahead with $N = 117$ participants divided into 10 groups.

Each group played six rounds of Public Goods Game and six rounds of Public Goods With Punishments Game. The participants of the game were anonymous to each other, there were visual barriers and they communicated per internet. The experimenters announced the deposit of each participants anonymously per internet, too. More over, the information about deposit did not allow to identify the depositor nor to link this information with previous rounds. It was important that the participants could not impose the punishment according to the long-term behavior, so that they could punished just particular deposit in particular round. The processing of data about the behavior of the participants aimed to answer following questions: (1) Does the excessively altruistic participant receive more disfavour in the group than his little less altruistic colleague? (2) In case of yes, which behavior is more typical for the spiteful punishing individual; the more selfish or more altruistic? To compare the results between the groups we ranked the extend of the deposit and punishment into relative order 1–12 within each group and each round.

Results: Question 1 – The relationship between the between the extent of punishment and the altruism: Linear regression showed a significantly higher variance explained by parabola than by the line (quadratic x linear: $p < 0.001$, Eta-squared-lin = 0.511, Eta-squared-kvad = 0.359). To distinction wish the “U shape” relation (decrease and increase) from the “L shape” relation (decrease and remain) we needed to approximate the data by a cubic curve; the contribution of the explained variance was approximately zero in accordance with the tested hypothesis (cubic x quadratic: $p = 0.761$, Eta-squared-cub = 0.001). The behavior preferred by the group (i.e. the less punished behavior) was nor the most altruistic nor the most selfish but the behavior somewhere between. In our research we found the optimum at the point $\text{punmin} = 0.911$ ($\sim 9 - 10$. from the rank 1 – 12), e.g. the more than average altruistic behavior, cca at the range of the upper quartile.

Question 2 – Who is the “culprit”? The results show that these are more selfish participants. 74 participants were the “fair punishers” (the rank of their punishment respected the rank of the deposit of the colleague that was punished), the rest of the participants (= 43) at least once were committed an “unfairness”. The “unfair punishers” deposit to the public goods significantly less than “fair punishers” in both game versions: with punishments (Mann Whitney test, $p < 0.001$) and without punishments ($p = 0.015$).

Perception, personality, and religion

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Belief in supernatural agents that intercede in human life is a characteristic of human groups across space. The adaptive value of the resulting behavior from this psychological bias is difficult to draw out because religious practices are widely divergent across cultures. This paper attempts to analyze theories in evolutionary psychology about why people believe in the supernatural using empirical evidence from perception analysis and questionnaire. Four variables are assessed: attribution of intention and anthropomorphism in description, religiosity, empathetic ability, and systemic ability. Belief in supernatural agents has been argued as not directly adaptive but instead exists as the byproduct of other adaptive mental systems. A mental module for detection of agents in one's environment has evolved to be hyperactive; it is absolutely essential in predator detection and prey detection. Because the benefits of seeing disturbances in the environment as being caused by agents that could potentially threaten or be a meal for the perceiver far out weigh the costs of misinterpreting the same stimulus, the module has evolved to be extremely sensitive. This system combined with "theory of mind," the human ability to understand the wants, desires, and internal state of others, cause a bias in perception that causes humans to see motivated agents everywhere. This gives the world a huge amount of intention and generates feelings of actors and cause where none truly exist. The symbolic representation of these intentional agents that we generate form our feelings of causality in our day-to-day existence are supernatural agents: ghosts, gods, fate, totems, fetish, and spirits (to name a few). I hypothesize that variation in intentionality bias should compliment variation in religiosity. To operationalize my intentionality variable I have asked students in introductory anthropology courses to write a description of a 25 second animation of geometric shapes moving around a field and "interacting". From these descriptions I use verbs that attribute intention to the "actors" and direct anthropomorphisms to generate a coefficient for intentionality bias. The coefficients for the other variables are generated with a questionnaire. Social ability (empathizing) should compliment intentionality rich descriptions while systemic ability should compliment intentionality poor descriptions as intentionality is possibly an expression of overactive social cognition. A direct comparison of systemizing and religiosity will be analyzed as well as empathy and religiosity to further explore cognitive differences causing variation in religiosity. Sex differences in systematizing and empathizing are analyzed as well as sex differences in religiosity.

Sexual activity and sport. A questionnaire study on perceived psychological effects on performance after intercourse versus masturbation

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A long tradition holds that those involved in active, competitive sports should refrain from having sex in the time before the event. Trainers of soccer teams, for instance, often put the players in a kind of sexual quarantine before important matches. In recent times, other opinions were voiced as well. Yet, evidence is mostly anecdotal, only very few empirical studies have been carried out so far (e.g. Lüben & Saß 1995, Zlanabitznig 1976) and even fewer have attempted to actually measure the effects of sex on physical performance (e.g. Sztajzel et al. 2000, Boone & Gilmore 1995, Johnson 1968). In this study, 229 males involved in active sports were asked to give their subjective evaluation. They represented team sports (e.g. soccer), endurance sports (e.g. long distance running and bicycling), sports mainly requiring muscle power (e.g. weightlifting), and combat sports (e.g. Taekwondo). Approximately half of the respondents believe that sexual activity before sport events may have an effect of their performance (positive or negative), the other half believe that there are no effects. An interesting outcome of the study was that 55% of the respondents perceive sexual intercourse 3 hours before a sport event as having effects on their performance whereas only 39.6% thought that masturbation has these effects. Of those who expect effects on performance a majority believes that these will be negative. Sexual intercourse is perceived to have more pronounced effects (e.g. "energy loss", compare concepts in Indian and other cultures of loss of vitality through ejaculation) than masturbation. This result was statistically significant. In contrast, perceived aggressiveness is thought to rise through refraining from sex and masturbation. This belief could well have a base in endocrinology. Prolactin, raised after intercourse, could lower ambition and aggression. Most studies found an increase in testosterone during abstinence. A possible prerequisite for this might be that abstinence is only periodical, i.e. that normally there is more or less regular sex (intercourse or masturbation - in the overall sample the weekly sex frequency of the respondents was about 4, that is higher than in the normal population) followed by a voluntarily controlled phase of abstinence. Men involved in combat and team sports requiring a very high level of aggressiveness, like boxing, handball and ice hockey, would thus benefit from refraining from sex (and the respective respondents in the present study actually used this strategy), whereas it is doubtful whether sexual abstinence shortly before the event and a thus induced higher level of testosterone, or other possible beneficial effects achieved through abstinence, are paying off in other kinds of sports.

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Teeth as ornament displays signalling mate quality

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Many species use ornament displays in the competition between rivals and to attract mates. Extreme examples of these are the stag's antlers and the peacock's tail. In other species these signals may be more subtle, including such things as the intensity of bill colouration or the size and condition of specific aspects of the plumage (for recent review, see Kraaijeveld et al, 2007). The quality of these displays are dependent on many factors including current disease state, genetic fitness and freedom from developmental adversity (Zahavi, 1975). As such, they provide important information about the physical condition of potential mates or rivals and can be of direct benefit in producing more or higher quality offspring (Andersson, 1994). Individuals displaying the right characteristics can gain considerable advantage. One of the most important human characteristics in this context is our propensity to show our teeth. Smiling is of course one of the first signals of sexual interest when directed towards a potential mate and this provides the same level of information about our condition as plumage or bill colouration does in other species. The absence of teeth, particularly the front teeth, indicates a poor developmental history. Whiter tooth colour is indicative of thick enamel, which means that teeth are more hardwearing and have greater resistance to tooth decay (crucial features in circumstances where teeth are essential for survival). Yellow teeth and factors such as bleeding gums and the visible presence of dental plaque are signs of infection and probable tooth loss. Finally, straightness and spacing of the teeth indicates genetic quality. Given the importance of teeth as ornament signals, the present study investigated the effects of digitally manipulating the teeth of photographs of models on ratings of their attractiveness. These manipulations were by colour (whitened, natural, yellowed), density (widely spaced, normal, supernumerary) and history (front tooth missing or not). Data were clear and showed that displays where teeth were widely spaced, yellowed and teeth were missing were viewed as the least attractive, whilst displays where teeth were normally spaced, whitened and with no teeth missing were considered to be the most attractive. It is therefore concluded that teeth do act to signal genetic quality, developmental history and current health but that the intervention of cosmetic dentistry means that these may no longer be honest signals.

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Acute psychosocial challenge and cardiac autonomic response in women: Relationship with adrenocortical function and behavioral coping strategy

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Introduction. Clinical and experimental data suggest that the amplitude of cardiovascular reactivity to acute stressors can be a good predictor of cardiovascular morbidity. Circulating glucocorticoids and sexual steroids are renowned modulating factors of cardiac autonomic stress reactivity. In addition, different modes of behavioral coping with a stressor may bring about different autonomic/neuroendocrine responses in ways that have important implications for health. The ethological approach to the analysis of human behavior represents a powerful tool for highlighting individual differences in behavioral coping and allows to relate physiological parameters with objectively quantified behavioral scores. This study on women aimed at investigating (i) the modulatory role of oestrogen and glucocorticoid concentrations on cardiac autonomic and behavioral reactivity to social and non-social acute challenges, and (ii) the relationship between the individual strategy of behavioral coping and cardiac autonomic stress reactivity. **Methods.** Thirty-six female university students (age: 19-28 years old) were studied, belonging to two different groups (D4 and D14, $n = 18$ each), tested respectively at the 4th (low estrogens) and the 14th (high estrogens) day after the beginning of the menstrual cycle. ECGs were recorded during four recording periods, each lasting 5 min: baseline, stress interview, mental task, and post-test. Heart rate - expressed as the average inter-beat-interval or RR (ms) - and vagal activity - expressed as r-MSSD (ms) - were quantified. During the stress interview, 37 patterns of non-verbal behavior were quantified by means of the Ethological Coding System for Interviews and grouped in 8 categories, each reflecting a different aspect of the subject's emotional/social attitude (eye contact, affiliation, submission, flight, gesture, assertion, displacement, relaxation). Blood samples were collected immediately after ECG baseline recording (pre-stress sample) and at the end of post-test period (post-stress sample), and plasma concentrations of cortisol, DHEA and estradiol determined via RIA. **Results.** As expected, D14 women had significantly higher estradiol levels as compared to their D4 counterparts (D4: 102.7 ± 10.8 pM/l; D14: 416.5 ± 62.0 pM/l; $t = -4.9$, $p < 0.01$). The stress phase produced robust increases in plasma cortisol levels as compared to baseline in both groups (D4: $t = -2.03$, $p < 0.05$; D14: $t = -2.65$, $p < 0.01$), but no significant differences between groups were detected. Similarly, the two groups did not differ for any of the behavioral categories considered. The social challenge (stress interview) induced a significant reduction of RR (i.e. heart rate acceleration) in both experimental groups (D4: $t = 3.09$, $p < 0.01$; D14: $t = 2.24$, $p < 0.05$), but again no significant differences between groups were observed, neither at baseline nor during the stress interview, mental task, and post-test phase. Given that no substantial group differences were observed between D4 and D14 women, correlation analyses were performed considering all the subjects as a single experimental group ($n = 36$). Pre-stress cortisol levels were negatively correlated with heart rate parameters (RR and r-MSSD) in all the recording periods, i.e. cortisol resting values were higher in subjects with higher heart rate and larger vagal inhibition at baseline, and during stress interview, mental task and recovery phase ($-0.34 < R < -0.42$, $p < 0.05$; only exception: baseline cortisol vs. r-MSSD during stress interview, $R = -0.31$, $p = 0.068$). Interestingly, the mean value of RR during both stress interview and post-test phase correlated negatively with submission score ($R = -0.34$, $p < 0.05$; $R = -0.34$, $p < 0.05$), and so did the values of r-MSSD ($R = -0.44$, $p < 0.01$; $R = -0.56$, $p < 0.01$). In other words, the higher the level of submission during the interview, the greater the heart rate acceleration and the degree of vagal withdrawal during stress and post-stress phase. Significant correlations with heart rate and vagal activity also involved displacement be-

havior. In particular, the values of RR and r-MSSD during post-test correlated positively with the displacement scores ($R=0.41$, $p<0.05$; $R=0.51$, $p<0.01$), i.e. the subjects exhibiting a higher degree of displacement during the interview were also characterized by lower heart rate increments and less pronounced vagal suppression during post stress recovery. Conclusions. This study suggests that the degree of heart rate and plasma cortisol increments induced by acute laboratory challenges are not influenced by oestrogen circulating levels. Interestingly, a higher level of adrenocortical activity at rest seems to predispose to a larger cardiovascular reactivity to acute social and non-social challenges. Our data also support the view that the individual strategy of behavioral coping with a stressor (as assessed via ethological analysis of nonverbal behavior) plays an important modulating role in cardiovascular reactivity. Indeed, submissive behavior was clearly associated with higher cardiovascular responsivity, both during and after the challenge. On the other hand, displacement behavior during the interview seems to serve as a behavioral strategy mitigating heart rate increase, sympathetic prevalence and vagal withdrawal following the challenge.

Friends as functional informants in men's and women's mating strategies

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Friends as functional informants in men's and women's mating strategies Does the degree to which information about potential mates is desired, respected, and received from male and female friends reflect its adaptive value? To address this question, 155 university students (69 men and 86 women) in Queensland, Australia, were surveyed about past conversations with their friends concerning members of the opposite sex or potential mates. Participants ($M = 20.86$ years) indicated the level and type of information they wished to receive from friends, as well as how much they had received. Type of information was organized into a number of theoretically established categories, based on its usefulness in solving problems relating to mate choice in the ancestral environment. For example, the categories included information regarding a potential mate's ability and willingness to invest in children or protect a partner and children, and information concerning a potential mate's aggressive tendencies, integrity, fertility, and fidelity. In addition, participants rated the reliability of the information received from male and female informants and how frequently they had provided advice about understanding and attracting the opposite sex. We proposed that information desired and received from adult friends about potential mates would systematically vary between the sexes and reflect their different mating strategies and concerns. In particular, because women suffer greater fitness costs from making bad mating decisions and are the choosier sex, they will desire more information concerning potential mates than men. In addition, because men engage in more intrasexual competition, they should desire and value the information they receive from their male friends, who are reproductive competitors, less than information from their female friends. Finally, it was expected that women would be more interested in obtaining information about men concerning their resource earning capacity, willingness to invest, integrity, and lack of aggressive tendencies, whereas men would be more interested in information relating to women's sexual fidelity and their physical characteristics (which serve as an indication of fecundity). Results generally supported most of the main predictions and revealed a number of interesting differences in the information about potential mates provided by friends and desired by participants. For example, women desired more information about potential mates overall than men, particularly information concerning a potential mate's resource earning capacity, willingness to invest in

children, ability to protect, and aggressive tendencies. As expected, men desired more information about a potential mate's physical traits than women. Participants rated the information received from female friends as more reliable than that received from men. Hence, not surprisingly, both men and women desired more information from their female friends than male friends. Although women desired more information overall, men were disproportionately interested in gaining advice from their female friends about the opposite sex, and receiving information about women's mate preferences or how to attract partners. In general, the findings support the view that friend informants play a functional role in the implementation of human mating strategies.

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Attachment among twin babies to their mothers: A case study of the effect of Postpartum Depression tendency in an ethologic approach

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Studies have shown that the exposition to different socio-affective environment in the first infancy promotes different ways of development. According to the Bowlby's Theory of Attachment, the links established early in life represents the basis for the development of affective and emotional relationships and of sense of trust in later relationships. Favorable environmental conditions make it possible for a child to build a positive relational model, and in that sense a lot of aspects of the development niche will be important, including factors related to primary caregivers and the cognitive and emotional abilities of the child. Women with Postpartum Depression (PPD) that presented different emotional states such as anger, indifference, loss of pleasure, apathy, excessive concern, as well as problems with appetite and pessimistic view about their own future can influence greatly the early behavior for the baby and thus affect construction of the system of attachment. The rate of prevalence of PPD in Brazilian cities comes to as high as 37.1%, making it important to study the risk of the PPD effects on the development of a secure attachment model, better inform and assist psychological and health care of pregnant women, mothers and babies. The present work is part of a multidisciplinary research on "Postpartum Depression: the genesis of the PPD and its effects on development", consisted of a longitudinal study since the last trimester of pregnancy up to 36 months in which will be analyzed different factors potentially associated with PPD, in different levels, including medical and psychological assessment and the neuropsychomotor development of the children. The aim of this case study was to investigate how the tie of attachment is established for a women presenting PPD, between her and her twin children, considering that twins represent increase amount of work and emotional load for the mother. The study investigated how each of the twins adapted to the adverse conditions influencing the mother and the establishment of attachment. The study had the participation of one family consisting of mother and healthy dizygotic twin babies – one male and one female, born at term. The boy stayed with the mother right after birth and the girl had to remain in the incubator during the first 24 hours. The mother was 18 years old, single, low income and presented high scores on the Edinburgh Postnatal Depression Scale (scale chosen for the evaluation of PPD). The triad was

followed longitudinally from the last trimester of pregnancy up to 14 months. The instruments used were: 1) interviews half-guides on six different occasions, with the objective of collecting information on the triad and on the mother's emotional condition, 2) situational test "Strange Situation" (SS) (Ainworth's et al.), performed and filmed in Laboratory of University of Sao Paulo when the babies were 14 months. The purpose was to observe and qualify the attachment, analyzing the need for the mother's participation in exploring toys and analyzing the reactions to separation from the mother and the behavior when they met again. Data analysis has concluded that despite the mother's PPD context and the difficulties of rearing twin children in an unfavorable environment, without the presence of the father, the biological program was manifested and secure attachment was established very differently with each of the children. The mother perceived and described the children differently, saying that the boy is difficult to deal with and is angry most of time while the girl requires little care. In the test of SS, both children have shown pro-activeness in exploring the toys, but in general, the boy presents better self-regulation in the presence of the mother, while the girl presents certain ambivalence sometimes showing indifference in the presence of the mother, while sometimes clinging onto her. This observation is shown in accordance to the expected behavior in the theory: since the boy receives more attention from the mother than the girl, he has greater assurances that he will get support in dangerous situations, while the girl, who does not count necessarily with the mother's attention, shows an ambivalent behavior. Concluding, these analysis show a complex pattern of effects: a single mother, the same environment, different babies and different relationship with the mother, that cause different behaviors in the mother and, consequently, different ways of establishing attachment and, thus, dealing with the environment presented. The results will be discussed in terms of the complexity of the ontogenetic process and in terms of the notion of adaptive ways of development, in face of different environmental conditions.

An evolutionary approach to male sexual dysfunction based on the defeat or rank theory of depression: From a mouse model to preliminary clinical data

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The results of several recent epidemiological surveys, shows that male sexual dysfunctions (e.g. erectile dysfunction and premature ejaculation) are extremely prevalent in the general population. These sexual disorders are strongly associated with aging and are influenced by a variety of medical, psychiatric, life style factors and have a significant relationship with mood, state and interpersonal functioning and overall quality of life. An emerging point of view in the last two decade shows that a combination of psychological (e.g. temperamental and personality trait), physiological (e.g. endocrine data) and ecological (e.g. social status) variables seem to be the most relevant factors to explain the develop of this difficulties. Recent epidemiological paper point out the relationships between depression, low dominance score and erectile dysfunctions. In

this context, the rank theory of depression (known also as defeat theory or resource loss theory) suggests that depression is highly correlated with perceptions of low rank and subordinate status. In fact depressed people has a degree of inhibition in engagement in certain social activities, see themselves as inferior to others and tend to behave submissively, all variables also associated with anxiety, especially social anxiety as a specific stressor. Under this respect in animal species a recurring factor, as the exposure to chronic social stress has been associated with many systemic and behavioural disorders. However, being exposed to social stress does not necessarily predict subsequent pathological consequences, in fact social factors (i.e. dominance and submission) are a key factor in individual disease susceptibility. The aim of this study is to investigate the impact of social stress such as defeat and loss of rank on male mice sexual behavior and tentatively compare preliminary human clinical data supporting the view that loss of resource and/or rank is a critical factor in the development of sexual dysfunction accompanied by depressive state . Animal model: In this paradigm, resident/intruder dyads lived chronically in sensory contact and physically interacted on a daily basis resulting in the resident or the intruder to acquire the dominant social rank. Thereafter sexual behavior and some anatomo-physiological parameters (mainly preputial glands, testis, Testosterone and Cortisol) were recorded dominants showed shorter latency to mount than subordinates. Human andrological data: Data were collected from male patients with secondary erectile dysfunction (ED; mean age=40 years) for > 6 month (mean=2.4 years) after losing their job. Each patient was first evaluated to exclude medical disorders and then evaluated by a psychological and clinical assessment. If only psycho-sexual dysfunction was present the patients were included into this study. In the first session the stress interview of the Ethological Coding System for Interviews (ECSI: Troisi A. 1999) was used. A week later hormonal analysis (Testosterone, LH, FSH, Cortisol, ACTH, Prolactin, β -estradiol), and psychometric assessment (Temperamental and Character inventory, 16-Personality Factor, Stay, Staxi) were made. The most striking result is the fact that erectile dysfunction accompanied by depressive state were recorded in 10 patients who recently (mean=14 months before) lost their job (i.e. equivalent of status).

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Marriage and its traditions among northern Khorassan's Kurds

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Kurdish tribes of khorassan, who had been living in ottoman territory, were immigrated to inside iran in Safavi dynasty because they believed in Shiite branch of Islam. Then they were moved to khorassan. They are living in northern khorassan in cities such as Esfarayen, Bojnord, Darehgaz, Shirvan, and Neyshabor now. Since kinship system of Kurds is centered on a patriarch family, they try to intermarry in their own clan to maintain a community life as their ancestors did. Hence marriage is of highest importance among Kurds. Their incentives for marriage are as follow: 1. maintenance of their clan and their families 2. spread of families 3. religious beliefs Kinship system and families are based upon patriarch family among Kurds and they usually intermarry in their own clans. However, marriage between different tribes is getting popular among them. Among Kurdish tribes of khorassan, selection of a partner as a wife or husband is

done in two ways-with the help of a middleman or without a middleman. The former is the one in which parents select a wife/husband for their offspring. The latter is the one in which two young people fall in love and decide to marry. They sometimes have to keep it between them because their parents usually oppose it strongly because father does not allow his children to connect with a different tribe and sometimes there is hostility between two tribes and finally two families might not be socially and economically equal. Anyhow, the popular way of marriage among Kurdish tribes is engagement which is called "souran" or "neshan" in Kurdish language.

2D:4D ratio, aggression and personality in Russian adolescents

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Human aggression is believed to be affected by several factors such as individual, cultural, and situational, in both males and females. Gender differences of aggression are established in most of cultures and vary from culture to culture. The goal of this study was to analyze the gender difference in correlations between 2D:4D ratio, aggression and personality. 305 schoolchildren (150 boys and 155 girls) from Moscow (Russia) were subjected to this study. We used the questionnaire technique and anthropological measurements. Objects of our study were groups of children from 10 to 17 ages. Significant gender differences were found for the right hand 2D:4D ratio, physical and verbal aggression, anger and hostility. Boys score higher on physical aggression, while girls on the other three parameters. The negative correlation between r2D:4D and anger was found for boys, while no correlations between digit ratio and ratings on aggression were found for girls. Self-ratings on aggression in boys and girls were negatively correlated with their popularity among peers (based on the peer ratings). Physical aggression in boys correlated significantly with their physical strength both in boys and girls. In addition, in girls, all aggressive scales (physical aggression, verbal aggression, anger and hostility) were positively correlated with dominance status, risk taking, physical strength, and negatively correlated with conscientiousness, and readiness to help. In both gender verbal aggression was correlated with risk taking. Self-ratings on verbal aggression in girls were also correlated with leadership. This study was supported by Russian Foundation for Basic Research (grant 07-06-0078a).

Paving the way for an evolutionary social constructivism

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The idea has recently taken root that evolutionary theory and social constructivism are less antagonistic than most theorists thought, and we have even seen attempts to integrate social constructivist and evolutionary approaches to human thought and behaviour. D.S. Wilson, for instance,

sees evolutionary social constructivism (ESC) as a middle ground between two well-known extreme claims, namely that the human mind is a flexible and general-purpose learning device, and that the mind should be seen as a kind of Swiss army knife made up of adapted specialized tools. However, if one wants to set social constructivism on an evolutionary foundation, one must not neglect to take into account its more specific claims. Hence, we discuss four core elements of social constructivism – essentializing reason; dominance and subordination; narratives and identities; theory-ladenness of observation – and suggest how they may be incorporated into evolutionary thinking, by considering ways in which evolution can explain why we socially construct things, rather than trying to explain them directly. Moreover, we focus on the neglected possible interdisciplinary traffic from social constructivism toward evolutionary approaches to human behaviour. (1) Essentializing Reason – Social constructivists analyze both how and why concepts and their transformations induce people to think the way they do, and what influence these transformations have on our behaviour. The concept of “mental illness” is a good example of our tendency to treat cultural artifacts as natural kinds. While many evolutionists agree with social constructivists that psychological essentialism is often ontologically unwarranted, this core element may lead to insights on how to counteract socially unwarranted instances of (adaptive) essentialist thinking. (2) Dominance and Subordination – It is assumed that “reason” is, at least partially, a function of nonreasonable processes, and that these nonreasonable forces are closely related to power (control/dominance over others/nature). The so-called “birth of the addict” illustrates how socio-cultural practices can override our inborn desire for power and status. This in turn leads us to look further for evolutionary explanations for why some of us willingly accept the concepts and thought processes determining our subordination. (3) Narratives and Identities – The influence of the conceptual transformations can also be seen in the use of narratives to structure our world and in the identities with which we attempt to navigate it: narratives shape reality itself. Here, both the use of stories as more or less trustworthy guides in a dangerous world, and the fact that nongenetic input is required to endow us with human identities, already gained some foothold in evolutionary theorizing about human behaviour. (4) Theory-Ladenness of Observation – Finally, social constructivists hold that scientific theories do not escape the general theory-ladenness of human observations. Combining moderate social-constructivist perspectives with evolutionary theory’s modular view of the mind allows us to shed light on how exactly the innate theory-ladenness of observation affects scientific theorizing, as well as helps us to explain why science is not immune to knowledge acquired through social transmission. Using the examples of comparative legal theory, same-sex sexual behaviour / homosexuality, and inbreeding avoidance / incest, we proceed to show how ESC can (a) reorient existing debates, (b) correct naive versions of both evolutionary approaches to human behaviour and social constructivism, and (c) generate new research hypotheses. In short, ESC is likely to be an indispensable building block for realizing the synthetic potential evolutionary theory has to offer to the social sciences.

Adolescent and single mom: Vulnerability for development of postpartum depression?

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Recent studies suggest that postpartum depression (PPD) affects from 10 to 20% of all women within the first six months after labor, with a peak by the 10th week (Clay & Seehusen, 2004; Robertson et al., 2004). The occurrence of PPD in adolescent mothers might reach 26% (Troutman & Cutrona, 1990). A large part of those studies has been run in United States and Europe, and PPD data for Brazil is very scarce. Theory A number of hypotheses have been suggested to explain PPD, amongst them the theory that PPD as a behavior pattern triggered to cause greater investment in the newborn by the mother's social support network. Objective: Investigate the occurrence of PPD – with particular attention to adolescent (< 18 years old) vs. adult comparison – evaluating the perception of social, material and emotional support in the network; and other potentially predictive factors such as mother's age, scarce or nonexistent social support, previous depression episodes. Method: Phase 01) Participants were gestants presenting for pre-natal exams at three local health centers in São Paulo, Brazil. In this first stage they were interviewed in loco about data regarding the baby's father and emotional aspects of the pregnancy, they also answered the portuguese validation for the Medical Outcomes Study Social Support Scale, intended to evaluate the available social support and Collins Attachment Scale, intended to evaluate the participants attachment style. Phase 02) A second interview, realized from 1 to 2 days postpartum, still in the hospital, intended to collect data about the last weeks of pregnancy and labor, and eventual difficulties in baby care. Phase 03) At the third month after delivering, the participants are invited for the last interview, to be realized at the Instituto de Psicologia of Universidade de São Paulo (IP-USP), after the interview they answered Edinburghs Postpartum Depression Scale, to detect the occurrence of PPD. Results: Until the present moment 80 mothers have completed the three phases of this study, 14 of those are adolescent. The occurrence of PPD was 32.1%; no significant differences were detected between adults and adolescent. However, when the Edinburgh Scale is analyzed, a tendency for a greater score amongst adolescent mothers without husband/partner is revealed. In other words, PPD appears to occur more intensely among single teenage mothers. Conclusion: The prevalence of PPD encountered is highly significant, which leads us to take into account local or sample peculiarities. Would there periphery neighborhood, low income and low degree of education be relevant factors on PPD occurrence? As for adolescent mothers, although it yet a small sample of participants, the results still indicate social support as a important factor for the development of PPD, and its absence a vulnerability issue for juveniles. This, yet partial, results do point toward the urgency of public health prevention measures in Brazil, a country with a continuously growing number of adolescent mothers.

Brazilian children's play from a rural village

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This work aimed to investigate play of Brazilian children and its relation with the context in a small rural village located in the Northeast region of the country. Based in naturalistic observation, thirty-two children, 20 boys and 12 girls, from 2 to 12 years old, engaged in play activities outdoor, were chosen for this study. This investigation focuses on play as a spontaneous phenomenon, which occurs without adult guidance and written rules. The focal sample method was applied with

5-minutes sessions. 55 episodes of play activities were observed. An interesting effect associating gender and age was first verified: the presence of girls became less as the age was more advanced, while the number of boys remained stable or even increased. This phenomenon is strongly associated as much with the fact that girls at an early age help their mothers in the domestic chores, leaving them little time to play outside the house, as it also relates to the common belief that the girls in the streets are more exposed to danger than the boys, mainly those of sexual nature. Related to play, the main results indicate that symbolic play was predominant over the total of episodes. The most frequent themes of symbolic play were: transport by boys (86%) and groups mixed with boys and girls (40%). Girls preferred to play of domestic activities (100%). This result shows the existence of gender stereotype among these children. Realistic subjects prevailed over fantasy ones, mainly their way of life. It is related to the representation of adults life that they observe freely and can be seen as influenced by aspects of the context, such as the local economic activity (transport in trucks) and the women roles in society: take care of the house and children. Games with rules, such as marble and soccer happened in 14% episodes, the plays and their rules were influenced by the physical characteristics of the context, for example: sand floor to play marble and free area in the street to play soccer. Physical exercise play was also very common as the children had free space to run without car transit and others aspects of urban areas. The children play with any object they found in the context (leaf, scrap metal, wood), which demonstrates imagination capacity and creativity. Due to poverty, they usually construct their own toy to play. Such fact can confirm their adaptation capacity and sensitivity to environment conditions. The context influence is clearly seen in the themes of pretend play, in adaptations done with the games rules, use of objects and verbalizations. These results show that the idea that poor children don't symbolize must be questioned and also reveal the necessity of studies with poor children in specific contexts. Data were consistent with our hypotheses about some existing particularities in the development that are associated with the cultural and familiar environment of the children.

On the origin of religion

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The European upper Paleolithic offers the unique possibility to study religions of hunter-gatherers undistorted by higher civilizations. Disposing of imagination, a theory of mind and an episodic memory, they were the first and only human species with a religious mind and created gods over a period of 30 000 years. Changing climatic conditions and the variability of the human mind resulted in a plurality of religious concepts, centered around survival and reproductive success. Impressing: the mistress of animals with a lion's head (36 000 BC) and the images of wild animals in the Aurignacian, in the following Gravettian a Magna Mater and many small mother figures. The glacial epoch of Würm 2 reduced the population of men and hunting animals to 10% and became a time of cultural transition: now we find the first powerful male entities: a shaman with a bird's head (16 000 BC) and a lord of animals with a stag's head (12 000 BC). The responsibility for the reproductive success turns from mother goddesses to the sexy Gönnersdorf-girls. Animals now are game. Grave offerings, and penis and hand drawings on cave walls will be discussed. We can presuppose offerings, rituals, taboos and myths, but no totemism and no human sacrifices. Unique: Human skulls as drinking vessels.

He has his father's eyes: An ethological approach for the ascription of resemblance of newborns by mothers

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Men may be more sensitive than women to the lack of parent-infant physical resemblance. It has been found that the perception of nonresemblance by fathers is correlated with marital violence and infanticide. It has also been found that neural activation of the left prefrontal cortex in men is greater and they are more influenced than women by child resemblance when making hypothetical parental investment decisions. Paternal uncertainty should be a masculine concern because of the risk of cuckoldry. Physical resemblance may be a paternity indicator and human females could have evolved counterstrategies to deal with the problems of paternity uncertainty. It has been hypothesized that they usually ascribe the resemblance of their infants to the fathers to assure paternity. The aim of our study was to determine if Brazilian mothers are more likely to ascribe the resemblance of their newborn to the father than to themselves or to other people. Data were analyzed as a function of the newborns sex and the marital status of the mother. We supposed that both boys and girls would have their physical resemblance ascribed to the fathers; we also supposed that women who did not live with their newborn's father would ascribe the resemblance of their babies to the father more often than those who live with their partners, because they would have greater need to assure paternity. Participants were 175 women who were interviewed zero to 125 days (mean = 10.1 days) after delivery. Mothers were asked whom their newborn looked like. Answers were categorized in four groups: 1 – mother; 2 – father; 3 – both mother and father and 4 – another person. Chi-square tests were used to compare the ascriptions of mothers to the null hypothesis that there would be an equal number of observations in all the four categories. It has been found that significantly more mothers (51.4%, $p < 0.001$) said that their babies looked like their fathers. The sex of the child did not significantly affect how mothers ascribed resemblance: both male and female newborns were said to resemble the father more frequently than to other people. These results were similar to other studies, supporting the theory that mothers ascribe resemblance more frequently to fathers to assure their paternity. However, contradicting our hypothesis, a marginally significant effect was found in the chi-square test, showing that mothers who did not live with the babies' father were more likely to say that their baby resembled the mother ($p = 0.082$) than mothers who lived with their partners. This might occur because most of the women who did not live with the babies' father had no expectation of help from the biological father, so not to ascribe the newborn's appearance to him could be a strategy to obtain paternal investment from subsequent partners. Generally, our findings are in accordance with the literature and could be explained by the theory which states that women who ascribed their children to the father, assuring his investment in the offspring, have been benefited by natural selection. However, resemblance attribution to father could be a strategy that occurs in minimally favorable conditions. This behavior would not occur in extreme cases in which the mother has no hope that the father would help her to raise the child.

Evolutionary roots of creativity

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Within the scope of my PhD thesis I am suggesting a new approach to explaining creativity, derived from evolutionary psychological stress research: I am assuming that the HPA-regulated stress system is playing a major role in the creative process. There are several important reasons for this view. Firstly, it is capable of explaining the dependency of creativity on social context (Belsky, 2007). The stress mechanism provides a socially triggered source of neuroplasticity, which is likely to account for the fluid intelligence necessary for creativity (Chiappe & MacDonald, 2005; Krill et al., 2007). The neuronal restructuring process underlying creative behavior is assumed to be triggered by (self-imposed) social sympathetic distress. Therefore, empathy can be considered as an emotional base of creativity (Hoffman, 1975). The available degree of empathy strongly depends on the early childhood calibration of the stress system. This is assumed to partly explain individual differences in creativity. Only individuals with low or moderate stress reactivity are assumed to be capable of highly creative behavior. Within this scope I also elaborated a neurobiological model of the neuronal interactions involved in the creative process. An interaction of three brain systems within creativity is assumed: (1) The “social brain”, comprising of the amygdala, the superior temporal sulcus (STS), the fusiform gyrus, and the prefrontal cortex. (2) The “explorative brain”, consisting of the ventral tegmental area (VTA), the nucleus accumbens (NaC), the substantia nigra (SN), the striatum, the anterior cingulate, as well as the prefrontal cortex. (3) The parts of the brain distinguished by a high level of plasticity, namely the hypothalamus as major component of the HPA-axis, the hippocampus, as well as to a lesser degree the amygdala and the prefrontal cortex. This model is able to explain key questions of creativity like crowding and ageing effects, the need for “creative breaks“, as well as its domain-specificity. Currently I am working on making my theory testable. Therefore I am evaluating several well-established clinical stress-questionnaires (PSQ, SACL, SAM, etc.) for their potential usability within the context of creative behavior. The goal is to assess the perceived stress while people are performing more or less creatively. If the theory is right it, stress should play a mediator role within the creative process – providing a deeper understanding for example for crowding effects of creativity than the currently applied intrinsic motivation theory. I am planning to apply my theory in the context of business creativity with the use of Idea Markets. Idea Markets are designed as virtual markets, where all participants are able to suggest new product ideas and collectively evaluate those ideas using the underlying market mechanism. Idea markets use idea stocks to represent new product ideas, which can be traded by participants on a virtual market place. The efficiency of markets and the resulting stock prices thereafter are used as an indicator for the possible success of the new product ideas (Soukhoroukova, 2007, p. 117). This technique offers several advantages with regard to our research question and also is fast and scalable, so we could test for intercultural and inter-temporal differences of creative outcome.

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Emotions research in Chile and Latin America: A preliminary account of the study of emotions in the region

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The present work reviews the research lines of the region in the study of emotions, as an attempt at systemizing the main contributions from a basic perspective in Latin America and Chile, and it has two specific purposes. The first one looks at the study of emotions in our country, beginning from the experiments developed at the Physiology Laboratory of Universidad de Chile in the 1970s. Secondly, the state of art in the study of emotions in Latin America is reviewed, looking at the production of the region in the last 15 years. For the first objective, the initial work of Bloch and Santibáñez (1972) has been compiled, extracting their central contributions to the field of emotions. For the achievement of the second objective, a procedure of three stages has been designed. First, six databases that contain the totality of the production at the local level (LILACS, Psycodoc, Redalyc, Scopus, ISI and PsycINFO) were consulted. In a second stage, the empirical articles of the last 15 years by authors that have regional affiliation were selected, resulting in a total of thirteen publications that fulfilled the criteria previously exposed. Finally, the publications were grouped by the country of origin, and then an account of its contributions was completed. Bloch's and Santibáñez's initial works in 1972, allowed conceptualizing emotions like a complete response of the organism, characterized by a muscular, expressive, and visceral pattern of activity that accompanies the events associated to the subjective experience of emotions. This implies that emotion and its corresponding bodily correlates take place simultaneously to its associated experience. Initially, this study characterized the peripheral changes that come along with six basic emotions, establishing that respiration and muscular activity would be the differencing element of the expression of basic emotions. In a second study, Bloch and Santibáñez established that the respiratory and muscular activity was central to the expression of true emotions. Finally, it was proven in a third study, that intervention of the muscular and respiratory patterns identified in the expression of basic emotions, impeded the complete experience of an emotional event, although the cognitive aspects of the evoked emotion were intact. Nowadays these findings have allowed for the development of strategies for emotional regulation in the training of actors. Regarding

the second objective, an account of a rather conservative regional production showed that Brazil is leading the production of the region with six publications. Chile has three empirical articles, Colombia has two, and Argentina, and Peru have published only one empirical article in the area of emotions. Brazilian studies are concerned with the strategies of emotional regulation for rage and sadness in Norwegian and Brazilian children, the study of schizophrenic patients' capability to perceive correctly emotions in others, the influence of emotional stimuli in attentional tasks, emotional expression in babies, and the normative validation of International Affective Picture's imagery System. The investigations in Chile include the relationship between occupation and the ability to recognize emotions, the importance of the nonverbal communication in the expression of the emotions, and the complementary strategies that configure the recognition of facial expression in schizophrenic and normal patients. In Colombia, two studies describe the evaluation of the reliability and validity of television scenes as stimuli to evoke basic emotions, and the role of emotional contents in the memory of stories. From Argentina, a study of facial recognition in schizophrenic patients has been published. In Peru, an investigation compared the local and European's conceptions of guilt and shame with four explanatory models for these emotions. To conclude, it is possible to assert that the reduced regional production in the study of emotions may be a sign that this is an emerging area for research in the region. The topics accounted for in publications include the recognition of emotions through photographic imagery in populations of different characteristics, cross-cultural studies, attempts to validate novel and ecological stimuli for the recognition of emotions, and validating stimuli used internationally to promote cross-cultural research. Indeed, the results of research in the region are in line with the international evidence of the past 15 years, although the diversity of investigations are an opportunity awaiting for the development of research lines that may contribute to the strengthening of evolutionary evidence of emotions as universal design features of the human condition.

How Emma learned to smile and frown. The implementation of the facial action coding system in an avatar

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Human facial expressions are crucial for communication in modulating the meaning of other signals, like speech. The internal and motivational state corresponds to a certain extent with facial expressions, however much is left to the interpretation of the observer. This study focuses on the perception of expressions, not on the production. Our componential approach assumes that there is informational value not only in basic expressions as described by categorical approaches, but even single action units have signal quality, whether or not combined with others. Virtual agents allow creating expressions of varying intensity and combinations of action units. This poses an excellent testbed for the exploration of the meaning of such displays. The avatar "Emma" with which we worked was constructed at the University of Bielefeld as an agent that should be able to communicate with humans autonomously and should be perceived as a real interaction partner.

We modeled 44 muscle contractions based on the Facial Action Coding System [3] on the avatar "Emma". The repertoire contained facial expressions, gaze directions and head turns. All behavior elements were combined randomly into 3517 complex displays, which were judged by 353 participants on the dimensions pleasure, arousal and dominance [4] (PAD; 18 items, 7-point Likert Scale). This study involves the largest repertoire of the Facial Action Coding System applied so far. The randomization program followed a set of rules that only allows anatomically possible combinations of AUs rules [5]. The aim of this study was to show that the ratings depend on the activation level of those action units involved in the particular face. Action units adopt typical values on the rating scales, which they maintain irrespective the combined other action units. The smoothing function "Loess" [1,2] produced a local regression of the ratings in two dimensions, for example pleasure and arousal, onto the intensity of one action unit. This relation can be visualized by three-dimensional plots. As a result, it could be determined how the intensity of the action unit modulated e.g. the pleasure-dominance-values. The plots of the AUs differed in their characteristics, indicating that the action units convey well-defined meanings in the factors pleasure, arousal and dominance. To build an architecture that can produce facial expressions, we used the connection between the AU-intensities and -ratings: The AU-values of the local regression of a given point in the judgement space were combined and the resulting face represented the expression suitable for the chosen PAD-values. We constructed a multidimensional space for the visualisation of pleasure, arousal and dominance for facial expressions, head positions and gaze directions. The values of pleasure, arousal and dominance drive the expressions, i.e. there is a display for each state in these dimensions. This allows controlling the facial expressions of "Emma" through an intrinsic mood-emotion-system.

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Mobility in the choice of dating places

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Edward Westermarck was the first to hypothesize that the incest taboo arises from a natural aversion fostered during early childhood association. The studies of Shepher (1971) on mate selection among kibbutz adolescents, and Wolf (1995; 2005) on minor marriages, have confirmed a negative imprinting for persons who were in close association during the sensitive period of infancy. In the present study we investigated a possible evolutionary factor related to incest avoidance. The hypothesis was that adolescents would prefer and evaluate more attracting dating and fun places that were farther from their home than those proximate to the place they grew up. A sample of 224 subjects (mean age: 24.4, 126 males and 98 females), were contacted at the entrance of discos and pubs. Participants were requested to fill in a questionnaire in which we collected information about their partner status (single, with partner), the typology of the city they lived, and if they lived in the place of their infancy. Participants were furthermore requested to list the five dating places (discos, pubs) they frequented more, along with their distance from their home. The results showed a significant interaction between partner status and gender. In single participants, males had a greater mobility in their preferred dating places than females, whereas in participants with a partner the mobility was significantly reduced and not influenced by gender. Participants that lived in the place they grew up preferred dating places that were farther from their home than participants that did not live in the place of their infancy. Participants that lived with their parents showed a greater mobility for the choice of dating places than individuals that did not live with their parents. Interestingly, also participants that lived in great cities, with a great availability of dating places at a short distance range, had a mean mobility of 18 km, demonstrating a preference for distance places. This phenomenon is also discussed in relation to the attraction bias for exotic places.

We all appreciate the same animals

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Animals have been an integral component of human culture and environment since the very beginning of our species and it can be assumed that our mind should be evolutionarily prepared to respond to animal stimuli. Thus we addressed the question whether there is cross-cultural congruence in aesthetic perception of animal species. To find the answer we enquired young people from Bolivia, Czech Republic, Morocco, Papua New Guinea and Philippines. All respondents were asked to rank the same set of 32 photographs of the python and boa species according to the perceived beauty of the depicted snake. We suppose that snakes represent biologically valid stimuli and that aesthetic preferences are rather complex indicator consisting of many non-rational factors. Mean ranks of the particular species obtained in different parts of the world tightly correlated, e.g. the correlation between mean ranks (i.e. perceived beauty) provided by European and Papuan respondents explained 76% of variation ($p < 0.0001$). Nevertheless, discriminant function analysis uncovered small but significant sex differences within the European sample and slight differences between ethnic groups (Europe and Papua). The letter disparity in ranking can be interpreted neither by personal experience nor the role of the species in the local culture, as five of the tested snake species are distributed in New Guinea and none of them has played a significant

role in ethnic differences. Papuan villagers described their rich experiences with snakes including culinary ones, however, it did not have any impact on resulting preference. We can conclude that aesthetic preferences towards animal species may be more universal than previously expected. Our results conform with the hypothesis that human mind evolved prior to geographic and cultural diversification of our species. In addition we raised the question what could be the causes of consistent and widely shared human aesthetic preferences to animal species. It is complex question, however, within a group of related species (boas and pythons) it is possible to encode many of animal's traits to identify the crucial ones, and some of respondent's characteristics can be obtained as well. In this experiment we showed photographs of 56 boa and python species to respondents from Czech Republic. We found presence of green and red colour, colourful patterns and shine on the animal body to predict higher attractiveness of the species to humans. Grey colour and thick neck of the animal had negative effect on the perceived beauty. Regarding characters of respondents, only presence of ophidiophobia slightly influenced ranking of the species. However, the effect of this variable is debatable because very few respondents displayed intensive fear of snakes. It was enticing to find out whether pre-school children (5-6 years) view animal beauty in the same way as adults. We found similar preferences for bright colours and the congruence of children and adults in perception of animal beauty was obvious. However, we found slight but interesting differences, e.g. children, in contrast with adults, prefer snakes with wide necks. There may be many interpretations of these results and the matter needs further study.

Triune brain's mechanisms of thought and behavior, death awareness, and origin of religion in early humans

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According to ethological point of view, the most important religious displays consist in the gathering of several human groups who perform repeated and prolonged demonstrations of submission toward dominant individuals. These dominant individuals take different forms in each culture but they share some characteristics including an immense power. For what concerns the genesis, in human mind, of the ideas of such immense power beings, some scholars, as Freud (*Totem und tabu*, 1913), felt that such beings could be the projection result of the figure of the "primordial horde's father" in a super-human world. In *The Naked Ape* (1967), Morris has proposed a sort of biological updating of the Freudian hypothesis. Divine beings resulted not from the projection of a "father", rather than from the projection of the figure of the dominant male of a "Single Male" breeding group. But, on the basis of the sexual dimorphism noticed in fossils, and inferring social behaviour from it, most scholars think that in ancient groups of Hominini endowed with low sexual dimorphism (especially in genus *Homo*), there wasn't any individual, as for dominant male of a SM social group, that could act as realistic example of a "Being with immense power". How did it happen, therefore, that among human beings with a low male-male competition social system we can find a projection in the super-human world of a being with immense power that should have to be associated with a high male-male competition social system? A possible answer is that the human brain preserved (and still preserves) structures and

hierarchy forming functions, which gave rise to conceive powerful leaders. Let us examine the human brain and its functions. MacLean described primate's brain as formed by three principal phylogenetic structure that have been super-imposed and have been integrated during evolution. He called these basic types Reptilian (protoreptilian, R – complex), Old mammalian (limbic system), and Neo mammalian (neo-cortex). According to MacLean the counterpart of the reptilian brain in mammals is fundamental for genetically constituted forms of behavior as hunting, homing, mating, breeding, imprinting and forming social hierarchies. The limbic system may be seen as a regulator of the R – complex, and most of this regulation seems to be inhibitory, while the neomammalian brain is the main seat of mind capabilities as, in humans, self-consciousness or the connections of causality. The neocortical concept of an “Immense powerful being” can be only created, according to the triune brain model, after a propose of the R-complex to the neomammalian brain. Consequently we can deduce that at some time in the course of human evolution such a nervous structure has been set free from the inhibitory action of the limbic system; this was presumably a consequence of a strong external stimulus which, causing a psychic trauma, weakened the inhibitory action of the limbic system. Indeed, according to evolutionary psychology, all human (or animal) behaviors are a product of internal mechanisms in conjunction with inputs that cause activation of those mechanisms: No mechanism, no behaviour; no input, no behaviour. We may presume that the “input” for the Prehistoric man consisted in the acquisition of the awareness of his own mortality. Homo sapiens is the only animal conscious of being mortal (also at collective level), but he does not recognize this fact as a natural datum. Instead he feels that death is a violence he has to suffer: we may presume that in this way death could have been considered by early humans. As Neocortex seeks to determine agents who cause phenomena (Barrett's Hyperactive agent-detection device), early humans tried to find the cause of death, but failed to find an empirical cause. Because of this shock, the limbic system activity on R-complex would have had a variation that caused the activation of hierarchic R-complex structures and that led the neocortical structures to accept the idea, proposed by the R-complex, that a “Powerful, but unseen, Being” was the agent of death. After this, the neocortical association areas, in relations to environment, developed various systems of religion.

IQ, anthropometrics and religious involvement in a students' sample

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Many studies underline the relationship of personality and psychological factors with religious behaviour and attitude. However, IQ was investigated in only a few studies. Moreover, the possible link between anthropometric features and religious behaviour have been neglected in such studies. We report a correlational study on the relationship between IQ and anthropometric measures on the one hand and a self-rating of participants' involvement in their own religious community on the other hand. Our hypothesis is that certain psychological and physical traits related to reduced fitness, such as low IQ, low attractiveness, high body mass index, and, for females, non-optimal waist-to-hip ratio, might result in considerable coping difficulties, and that such difficulties could in turn motivate individuals to seek the social support offered by the religious community. Moreover, these coping difficulties could foster an external locus of control,

a likely predictor of the tendency to seek such support. Data on about ninety undergraduate students were collected. Subjects' photographs and anthropometric measurements were taken. Then, they were administered Raven's Matrices (measuring IQ) and Rotter's Test (measuring locus of control). Ultimately, they indicated the degree (if any) of the involvement in their own religious community. We expected that low IQ, low attractiveness (as judged by independent ratings of the participants' photographs), high body mass index, and high departure from optimal waist-to-hip ratio (in females) would predict subjects' high religious involvement. In contemporary Western society, physical attractiveness, as well as being a reliable cue of fitness, is much valued a trait in interpersonal relations and social success. Thus, in our opinion, the relationship between religious involvement and low attractiveness might turn out to be quite strong. In sum, our aim was to test the existence of the hypothesized correlations and to examine their relative strength. The analyses carried out up to now (seventy female subjects) seem to indicate a negative correlation both a) between IQ and religious involvement and b) between physical attractiveness and religious involvement, and a positive correlation between body mass index and religious involvement.

The role of facial symmetry in mate choice

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From an evolutionary perspective, the psychological mechanisms that judge the physical attractiveness are adaptations that have evolved to increase reproductive success. The face, the part of the body most implied in interpersonal recognition, seems to be one of the most important biological components in the process of mate choice. Recent studies have shown that facial symmetry can be an important indicator of the stability in the development and individual's health. Our study was carried out in diverse public organisms of Santiago de Chile with 718 heterosexual people, 262 men (mean age: 30; range: 18-62 years) and 456 women (mean age: 29, range: 18-63 years), using questionnaires in which they had to evaluate three images of faces of people of the opposite sex with different levels of facial symmetry. In the girl's pictures, the one with smaller facial symmetry had the lips (almost imperceptibly) painted. We considered the following variables: physical attractiveness, personality, luck with the opposite sex, intelligence, health, desirability for a long term or a short term relationship (infidelity), care of the children, and social dominance. Most of the women considered the man with higher facial symmetry as the most attractive (62%), healthier (34%), luckier with the opposite sex (68%), greater personality (63%), more desirable for casual sexual relationships and infidelities (44%), and of higher social dominance (39%). However, the man with the less facial symmetry was considered by most women as having more intelligence (32%) and as being better in the care of children (41%). Contrary to our expectations, most of the men considered the woman with less symmetrical face (but with the slightly painted lips) as healthier (41%), luckier with the opposite sex (50%), greater personality (44%), and of higher social dominance (33%). The woman with the most facial symmetry was considered by the majority of men as having more intelligence (37%) and as being better in the care of children (35%). Both higher and less facial symmetry women were considered by most men (31% in both cases) as the most attractive. We concluded that the facial symmetry influences

the evaluation of the pair's characteristics, but, in addition to symmetry, other factors like the use of artificial beauty products, can be more important phenotypic signals than facial symmetry.

The signal quality of head movements

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Human communication is not limited to verbal messages, but is complemented by nonverbal signals. Nonverbal messages play an important role, especially in regard to feedback and feedback signals. According to Allwood et al. (1993), feedback consists of methods to exchange information about four essential communicative functions: The recipient informs the contributor about his or her ability and willingness to communicate, to perceive and to understand the information, and whether he or she accepts the information. Above that, the meaning of verbal information is supported and/or altered through nonverbal signaling. Nonverbal signals also convey emotional states and relative dominance. In this project, we investigated the communicative function of head movements, i.e. how head nods and jerks affect the perception of others. We filmed interactions between two people who had the task to find out as much as possible about each other in three minutes. We discarded the first and the last minute and analyzed the behavior in Anvil. We then focused on qualitative aspects of head movements and transferred them into a 3D-environment, i.e. we translated them into head movements of a female avatar in Poser. Altogether, we had 41 movies, which included single and repeated nods (14) and jerks (27). A head movement is defined as a nod when the head goes down and then up, and as a jerk when the head moves up first and then down. These stimulus movies were subjected to a rating study, in which 62 participants (32 women aged 21.8 and 30 men aged 23.7 years) assessed the stimuli with Russel & Mehrabian's (1974) 18 items for pleasure, arousal and dominance. All of the participants were students from the University of Vienna. Each participant evaluated ten movies. A principal component analysis of the 18 items revealed the three dimensions "pleasure", "arousal" and "dominance", explaining 85.6% of the total variance. Our results show that jerks are perceived as more dominant than nods. Moreover, jerks are associated with higher values of pleasure. Arousal is linked to the speed of the head movements - the faster a movement is, the more aroused it appears. Additionally, high arousal is related to fewer minima, i.e. fewer backward movements of the head, and dominance increases with the number of minima. Dominance is also expressed in reduced emphasis, i.e. lower amplitudes of movements. High pleasure is connected with a larger number of maxima, i.e. movements of the head towards the chest. Our findings suggest that head movements are suitable signals for the dimensions pleasure, arousal and dominance. The present data allow for the construction of a testable model, which can be implemented in virtual human agents to simulate appropriate nonverbal feedback in different kinds of interactions.

The human ability to discern resemblance in 2D geometrically transformed facial photographs: An evolutionary account

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Purpose: Inclusive fitness theory gives rise to the supposition that natural selection favours organisms that are capable of assessing the degree of genotypic similarity between different individuals. Individuals who can evaluate the degree of kinship or the degree of genetic similarity in general probably benefit from a more effective allocation of their resources in terms of inclusive fitness when cooperating with others. Comparing morphological phenotypes – for instance of supposed kin and strangers – is one of several disputed means of assessment of genotypic similarity. Warps and morphs of facial photographs are common stimuli for experiments designed for testing hypotheses derived from inclusive fitness theory relying on phenotype comparison. Hence, we would like to know the extent to which computer-generated similarity or dissimilarity can be discerned as phenotypic resemblance or dissimilarity, respectively, by humans. Method: Facial photographs of 20 female and 19 male students were used to produce 20 warps of varying degree of (dis-)similarity for each of the source faces. Each trial three warps were presented to subjects: one of computed similarity, one of computed dissimilarity of the same degree to the reference, and one derived from another face. The warps were shown in a randomised order at each trial controlling for order effects of presentation. 21 women and 20 men, other than the photographed subjects, were asked to distinguish between the stimuli based on perceived (dis-)similarity to the reference. They should indicate which of the three warps appeared to them most similar or most dissimilar, respectively, to the source face. Results: Higher degrees of computed (dis-)similarity led to higher rates of correct indication. This finding implies 1) that the morphing and warping methods deployed in this study are appropriate to produce facial stimuli of varying degrees of (dis-)similarity and 2) that humans are able to perceive this type of (dis-)similarity. This allows for having a closer look at possible sex differences in the ability to perceive facial (dis-)similarity: Women assessed (dis-)similarity correctly somewhat more often than men and (dis-)similarity was assessed somewhat more easily in female faces by both male and female subjects. Discussion: Rates of correct (dis-)similarity assessment positively correlated with degree of (dis-)similarity, but never exceeded 80 percent. The obvious difference between the warps, which were derived from morphs, and the natural photographs showing the source faces might account for this upper limit of correct assessment. There are some differences in the ability to assess facial (dis-)similarity between female and male subjects, but the effect sizes are too small to have any practical implications. The occurrence of a little bit higher rates of correct assessment in women might be due to the widespread, well-known tendency for undergraduate women to be more conscientious in their efforts to carry out any sort of experimental task. This finding might appear surprising as there some theories supposing that the ability to assess phenotypic resemblance is more important to one of sexes than to the other: For instance, fathers face, unlike mothers, parental uncertainty (Voland 2000) which makes it more critical to them than to mothers to assess parenthood in order to reduce the risk of squandering parental investment on non-relatives (Daly & Wilson 1988). In addition to minimizing paternal uncertainty, men might attempt to rely on similarity assessment in order to decide upon forming, continuing and breaking alliances (Chagnon 1979) for two reasons: First, one can expect kin to be especially cooperative (Hamilton 1964). Second, phenotypic resemblance to oneself might imply genetic similarity and hence similar behavioral predispositions as far as they are

genetically determined. Phenotypic resemblance might therefore function as a means of predicting another's behavior by projecting one's own behavioral predispositions (Rushton 1989). To the contrary, female dispersal hypothesis suggests that the ability to recognize and favor potentially remote relatives or other genetically similar individuals meant a more substantial gain in terms of inclusive fitness to females than to males as it were normally the females who left their birth groups to join relatively unknown groups of conspecifics in order to avoid inbreeding (Pusey & Packer 1987). Nevertheless, this study replicates findings of similar studies which showed that – at least at a conscious level (Platek et al. 2003) – men and women are equally good at judging familial relatedness (eg. Nesse et al. 1989). We go along with Nesse et al.'s argument that no observable sexual dimorphism with respect to the ability to discern facial resemblance developed in the evolution of human beings because this ability is not costly.

The objectively assessed femininity of women and the relationship with Cattell's personality traits

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Evolutionarily based theories predict that feminine morphological features should correspond to female fertility and reproductive success. Previous studies have found that attractive women are rated as more feminine. Moreover, one recent study showed that female femininity as assessed by photogrammetric measurements was connected with levels of oestrogen, a 'female' hormone. Some authors have suggested that cues of masculinity or femininity could constitute signals of dominance and non-dominance, respectively. In our study, we focused on the association between facial femininity and psychological characteristics. In previous studies, female femininity has been assessed by subjective ratings or by photogrammetric methods. Yet these methods can meet with confounds such as individual rater variability or methodological limitations of photogrammetric techniques. Therefore, femininity in our study was assessed by anthroposcopy, a technique which is commonly used in the field of plastic surgery for the qualitative assessment of morphological features. The anthroposcopic approach provides more complex information on relative proportions of physical features rather than absolute metric data. In our sample, we took both frontal and profile neutral-expression facial photographs, and anthropometrical head measurements, of 119 female students. Participants also completed Cattell's 16PF questionnaire. Due to the great morphological complexity of most facial features, we carried out an anthroposcopic analysis of the two photographs (frontal view and profile) for each subject. We created a femininity index (16 features), which included the most distinctive sexually dimorphic features: facial form; size of arcus superciliares and glabella; forehead height and profile; tubera frontalia; chin width, height, shape and profile; eyebrow thickness; nose height; direction of nose tip; shape of nose profile;

lip thickness; and height of eye opening. Anthropometrical head measurements included the following measures: face width, jawbone angle width, depth of jawbone, cheekbone arch, jawbone arch, distance between the inner corners of the eyes, distance between the outer corners of the eyes, inter-pupillary distance, nose width, mouth width, physiognomic face height, morphological face height, upper face physiognomic height, upper face anatomical height, nose height, nose depth, nose width and lower face height. We used linear regression to assess the relationship between the anthroposcopy index of femininity and the anthropometric measurements. We found a negative correlation with face width, jawbone angle width, depth of jawbones, cheekbone arch and jawbone arch. Assessment of the relationship among the anthropometric measurements, with Principal Component Analysis with varimax rotation, revealed six separate components. The first component explained 23.8% of variability and was loaded with the anthropometrical measurements, which simultaneously correlated negatively with the femininity index (face width, jawbone angle width, depth of jawbones, cheekbone arch and jawbone arch). Of the six components, it was the only one that was positively correlated with the index of femininity. These results showed that our index of femininity based on the classification of individual morphological features (i.e. anthroposcopy) and their position relative to the other facial feature was intercorrelated with objectively assessed metrical data. The femininity index correlated with two primary factors from Cattell's personality questionnaire: negatively with the factor Low integration (undisciplined self-conflict) and positively with the factor High tension. Additionally, the femininity index correlated positively with one secondary factor, Anxiety. We suggest that these morphological features and psychological characteristics might develop under the control of steroid hormones, particularly during puberty.

Evolutionary wisdom and jealousy in a different cultural context: Chileans' beliefs about the concomitant occurrence of love and sex

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For over a decade, the explanation for sex differences in the type of infidelity that is more distressing for men and women has been debated by perspectives attributing it either to social roles or evolutionary influences. According to a purely socially oriented view of human behavior, the widely documented finding that men are more distressed than women by sexual infidelity, and that women are more distressed than men by emotional infidelity, is the result of socialization and social roles influences. That is, men are more distressed by sexual infidelity because they know that sexual relationships should lead women to certainly engage in emotional bonding with someone else. Similarly, women are more distressed than men by emotional infidelity, because they know that when they are in love, women are very likely to also engage in sexual relationships. The influence of these beliefs about the other sex on jealousy results, have been called the double-shot hypothesis, and they reflect sexually differentiated beliefs about the other sex, that are learned throughout socialization. Conversely, an alternative and universally supported hypothesis is that men and women faced different adaptive problems during evolution, and that the bias toward more distress for emotional infidelity in women responds to their need to accrue parental investment, bonding, and long term commitment for their offspring. In men, on the other hand,

the bias towards more distress by sexual infidelity reflects their concern for parental uncertainty, risking their inclusive fitness by accepting sexual infidelity from a potentially reproductive partner. Evolutionary Psychology has repeatedly sustained the convergence of cultural practices (beliefs) and genetic influences on behavior, and in the present investigation the methods developed to test both, social roles and an evolutionary perspective, are implemented. Thus, a test of the plausibility of the double shot hypothesis is implemented in a different country, and in a different language from the original debated studies, adding to the results from research in Europe and the US. A total of 194 university students (88 men and 206 women) answered the seven different formats that have been developed to measure jealousy in forced-choice scenarios that yielded sexual and emotional infidelity dichotomous, mutually exclusive, and occurring together. Conditional beliefs about the other sex which may moderate the results of jealousy choice were investigated, and hypotheses about sex differences in jealousy should not vary if beliefs are not the direct cause of this asymmetry. Following the protocol of Buss et al. (1999), a significantly higher percentage of men were more distressed than women by sexual over emotional infidelity, and a significant percentage of women were more distressed than men by emotional over sexual infidelity, in all of the conditional scenarios, rendering the beliefs perspective and the double shot hypothesis unconfirmed. As predicted by evolutionary psychology, beliefs about the conditional probability of love and sexual involvement were similar across sex, and after controlling for these beliefs, sex differences in the kind of infidelity that accounted for jealousy remained significant. Finally, data available in the literature from Argentina is consistent with the present results, and supports the extension of an evolutionary perspective to the southern hemisphere. An important kind of evidence that strengthens evolutionary explanations is the universality of its tenets, regardless of language distinctions and cultural variability which cannot be separated from the influences of human evolutionary history on present behavior.

The effect of axillary hair shaving on odor pleasantness

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Individually specific axillary odor is a product of the skin microflora in the armpit area whose properties depend partly on numerous environmental factors. One of these is the presence of armpit hair which is proposed to serve to retain chemical compounds active in communication processes. The aim of our study, in four independent experiments, was to test the effect of armpit shaving and consequent growing of axillary hair on axillary odor hedonics. To avoid body odor fluctuations across the menstrual cycle we chose only male subjects as odor donors. Odor samples were provided by both male odor donors who regularly shaved their armpits and men who had never shaved their armpits before. Odor samples were collected on cotton pads that the donors wore in their armpits for 24 hours. Samples were rated on 7-point scales for their intensity, pleasantness, attractiveness and masculinity by an independent group of women. Each woman rated men's armpit odor samples, both the unshaved and shaved (or subsequently regrowing hair), and two non-human samples as a control (cinnamon and castoreum). In Experiment I and II, odor sampling was carried out four times over six weeks. Following the initial sampling session (Session 1), the subsequent sessions took place after one (Session 2), three (Session 3) and six weeks

(Session 4). In Experiment III and IV, odor sampling was carried out three times over ten weeks. Specifically, following the initial sampling session (Session 1), the subsequent sessions took place after six (Session 2) and ten weeks (Session 3). Results of Experiment I show the axillary odor of the shaved armpits was rated as more pleasant, more attractive and less intense compared to the unshaved armpits of the same individuals. However, negative results of Experiment II and III suggests that the effect of shaving may be fairly minor. Moreover, the influence of one-shot shaving is only transient. There were no significant differences in perceptions of odor comparing unshaved armpits with armpits after one week of hair regrowth; or comparing regularly shaved armpits with armpits after one or three weeks of hair regrowth. In contrast, the odor of shaved armpits was rated as significantly more attractive compared to the armpits where hair had been regrowing for six or ten weeks. Our results partly support the idea that armpit hair evolved to retain chemicals active in human chemical ecology and that this factor should be controlled for in human body odor studies.

Parental investment allocation mechanism: Individual differences in Brazilian adults

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Individuals allocate their efforts (energy, time and resources) in different domains of life, including the somatic, reproductive and nepotism areas. Since the efforts relevant to the evolution are limited, their allocation faces a dilemma of choice between the different life domains, which involve the evaluation of costs and benefits resulting from these investments. In the reproductive domain the trade-offs are illustrated by the differentiated allocation of effort to parenting versus mating activities. Mating efforts include short-term sexual strategies and the competition among partners, while the parental efforts include long-term sexual strategies, which involve smaller number of partners and bigger investment on the offspring. The advent of puberty (sexual maturation), the beginning of the reproductive stage requires a substantial amount of efforts in this specific domain. The reproductive efforts reach their peak at the beginning of adult life and decrease significantly as time goes by. In this domain, individuals who engage in parental effort could be doing other things with their limited time and energy, such as devoting greater effort to mating. However, as the years go by in the individuals' lives, a transition can be observed, with a gradual rise in the allocation to the sphere of parental efforts in detriment to the mating efforts. Thus, costs include the lost benefits of potentially productive yet foregone activities. This notion is the basis of the sexual strategies. The sexual strategies (or mating strategies) are integrated sets of adaptations that organize and guide an individual's reproductive effort. The concept of the sociosexuality reflects the individual variation in the sexual strategies in the solution of the dilemma of the reproductive sphere between the mating effort and the parental effort, making it a good indicator of the sexual strategies and tactics used by individuals. The research had the participation of 81 employees of a Brazilian Public University - 39 men (age = 36.27 + 8.078 years) and 42 women (age = 40.61 + 9.113). They answered voluntarily and anonymously the Sociosexual Orientation Inventory and questions about their relationship situation, and about use of alcohol and cigarettes.

In our findings, the men were more unrestricted ($F = 14.592$; $p = 0.000$), had the first sexual intercourse earlier in life ($F = 7.248$; $p = 0.009$) and consumed more doses of alcohol at parties ($F = 11.864$; $p = 0.001$), thus confirming the results found among young adults. This calibration of the sociosexuality, the first sexual intercourse and the consumption of alcohol reflect a greater allocation of efforts to mating, since men invest less time on the offspring compared to women. The women were more restricted, had the first sexual intercourse later in life, and consumed less doses of alcohol at parties; this calibration of the feminine sociosexuality reflects greater allocation to the parental efforts. Other inter-sexual differences that we could expect, as the young adults researches show us, are women having a higher number of long term relationships during their life and being, in the present, more engaged in long-term relationships, showing a different marital status ratio, but in this age women did not differ from men. This lack of gender difference in the engagement in stable relationships reflects a change in the resource allocation referring to this dilemma, moving toward the increase in allocation in parental efforts by men, despite the maintenance of a sexual strategy that is more unrestricted than the feminine one, predicted by the Parental Investment Theory. The intra-sexual variation is not presented as being connected to the inter-sexual variation, as we would have expected in young adults. Unrestricted men have their first sexual intercourse later on in life ($r = 0.447$; $p = 0.008$) and smoke more cigarettes ($r = 0.387$; $p = 0.024$). The unrestricted women have their first sexual intercourse earlier in life ($r = 0.522$; $p = 0.001$) and have a less frequent smoking habit ($r = 0.456$; $p = 0.003$). The sociosexuality has proven to be a good indicator of the allocation efforts to solve the dilemma of investing in the mating sphere or in the parenting sphere. Our findings, as expected in the case of adult individuals, differed from the literature about young adults, since the adults find themselves in a transition stage referring to the allocation of resources in the reproductive domain.

Mental adaptation to allocate parental investment: Evolutionary trade-offs explains inter and intrasexual differences on sexual strategies

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Evolutionary relevant efforts (energy, time, resources) are limited, therefore their allocation faces trade-offs. The reproduction domain shows a trade-off between mating and parental efforts. Allocating efforts on mating implies less parental investment and vice-versa. Mating efforts include search for different partners (short-term sexual strategies, premature sex) and competition among partners (risk behavior), while parental efforts include long-term sexual strategies, falling in love, fidelity and investments on the children. Sociosexuality describes the individual variation (intra and inter-sexual) in the sexual strategies, revealing the dispositional tendency to resolve exactly this trade-off. Unrestricted sociosexual orientation is characterized by the greater acceptance regarding the casual sex (mating allocation) and the restricted orientation demanded affective involvement and commitment previous to sexual relation (parental allocation). The inter-sexual variation on the reproductive behaviors was selected by the different level of parental allocations associated with each sex. Women have a greater obligatory parental investment (due to pregnancy, breastfeed and care); men invest more in mating, having higher tendency to casual sex and risk

behaviors (such as the greater use of toxic substances – alcohol). The intra-sexual variation on the reproductive behaviors is also related to the different allocations of parental investment of each person in each period of life, that depends on environmental adjusts. Then restricted men and women will present greater investment in commitment (parental allocation), while those unrestricted will show premature sex and superior alcohol consumption (mating investment). We analyzed the individual differences (inter and intra-sexual) in the sociosexuality according to the predictions from the evolutionary allocation trade-off analysis based on the Parental Investment Theory and the Life Histories Theory. 112 men and 109 women (age: 21,00 + 2,10) third year graduate in Veterinary, Engineering, Social Sciences and Psychology, voluntarily and anonymously answered the Sociosexual Orientation Inventory and questions regarding relationship situation, alcohol and smoking habits. Men were more unrestricted ($p = 0,000$), had the first sexual relation earlier in life ($p = 0,026$) and consumed higher alcohol doses at parties ($p = 0,000$). This calibration of sociosexuality, premature sex and higher alcohol consumption imply on a greater mating allocation. Women were more restrict, had more previous relationships ($p = 0,016$) and were in a higher number on long-term relationships ($p = 0,003$) and in love ($p = 0,023$). This calibration of sociosexuality, long-term dating and passion, indicates a greater parental allocation. The intra-sexual variation is coherently related with the inter-sexual variation. Unrestricted men showed a masculine profile intensified: they had more premature sex ($p = 0,019$), had smoking ($p = 0,003$) and drinking habits ($p = 0,007$), started to drink earlier in life ($p = 0,042$), drank larger amounts of alcohol at parties ($p = 0,003$), were not dating ($p = 0,006$) nor in love ($p = 0,002$). Unrestricted women also exhibit a masculine profile: they had premature sex ($p = 0,002$), had smoking ($p = 0,013$) and drinking habits ($p = 0,001$), drink more often ($p = 0,021$), and drank larger amounts of alcohol at parties ($p = 0,000$). The sociosexuality seems a good indicative of the trade-off solution between mating or parental allocations efforts. The evolutionary allocation trade-off gives a single explanation to inter and intra-sexual variations. Based on this single explanation and on the idea that allocations of effort themselves depend on psychological specialized adaptations, it's possible to suggest a mental adaptation specialized in the allocation of parental investments. The same mental adaptation responsible for the coherent investments allocation in mating or parental is accessed to the coevolved adjustment from all mental adaptations of the reproductive domain. This mental allocation adaptation seems to be affected by the presence of passion and long-term dating differently for each sex, being the male allocation more sensible. Our results indicated that long-term relationship and passion have stronger effect on male sociosexuality, increasing restriction; possibly because women are searching for commitment more typically, what adaptively assures the investment of his resources on her and the children. Passion would be a reliable indicator of male commitment and parental allocation investment accessed during the partner selection. This indicates that the same mental adaptation responsible to the allocation of parental investments, that originate the individual variations, presents different allocation sensibilities and specificities for each sex, that need a profounder study.

Mechanisms of survival, reproduction and adaptation in the light of conflict and resolution in the human family

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Mechanisms of survival, reproduction and adaptation in the light of conflict and resolution in the human family For some 25 years starting in 1977, I observed the lives of several families in Hungary (through the Department of Sociology at the ELTE University of Budapest, led by Dr Péter Somlai), then in Belgium, in a longitudinal family sociological study. I studied conflicts within families where several generations lived together, as well as mechanisms used by family members to resolve these conflicts. The families I observed during my field research, although living in different socio-economic and cultural settings (families included farmers in more and less densely inhabited rural areas, urban intellectuals, unemployed people and foreigners), were different or similar not so much in socio-economic or cultural terms, but rather in terms of how they formed relations and survived or resolved family conflicts. Based on an examination of social relations in animals and in humans, and specifically in families, I concluded that these families, like any entity created by living beings, have three main goals: ensuring the survival of individual members (this includes eating, obtaining food, finding resources, and maintaining physical, mental and emotional health), reproduction (selecting a partner, courtship, coupling, and caring for and raising offspring), and adaptation (to the given environment as well as to the members of the group) in order to help achieve both of the first goals. The more complex environmental and societal structures an animal or a human lives in, the more refined behavior patterns they need to develop in order to adapt to changing environmental conditions and to other members of the same species with as little confrontation as possible. The dynamic functional mechanisms of the human family are much less different than one might think from the co-existence mechanisms of social mammals, especially apes. Certain behaviour patterns will be constructive in terms of maintaining the animal group or human family in question; others will be destructive and promote the ultimate dissolution of the group or family. In the animal world, basic conflicts and biological clashes of interest which may provoke aggression between individuals concern the following areas: 1. Aggression towards members of the same species with a view to acquiring or defending territory. 2. Aggression towards members of the same species with a view to asserting dominance within the group. 3. Aggression associated with reproduction. 4. Parental aggression towards offspring. According to the theory outlined here, the same basic conflicts appear universally in human families as well. Elements of struggle over territory and dominance are involved in basic conflicts of biological interest between parent and child, sibling aggression and conjugal aggression, while forms of reproduction-related aggression may be observed in conjugal conflicts. In animals, aggression and its mitigation or resolution also involve the following areas: 1. Struggles for dominance and their resolution: dominance-hierarchy or ritualization. Even more refined tools are mechanisms for consoling and appeasing, for example in bonobos and chimpanzees. 2. Mitigation of territorial aggression through physiological marking (animals draw a sort of 'fence' around themselves on their territory), or through ritualization. 3. Mitigation of reproduction-related aggression. The pacifying role of sexuality, or the mitigation of aggression through characteristic gender behaviour. 4. The pacifying role of co-operation and sharing. More complex ways of resolving conflicts: 5. Coalitions among male chimpanzees and 6. Existence of a more versatile hierarchy; in bonobos, for instance, mediation between two sides has been required: pacifying, impartial mediation (by females). 7. Animal communication synchronizes the behaviour patterns of individuals in a group in the relatively most honest way possible. 8. Cohesion is vital for individuals in animal groups as well, even though their formation, dissolution and transformations are more fluid than in human families. Conflicts and conflict resolution within human families cover similar areas: 1. The value-free concept of dominance is relative power and influence arising from one's position in the family hierarchy, with the ultimate aim of strengthening family cohesion. 2. In the case of families, territorial conflicts are replaced by conflicts over intimacy and personal space, regulating closeness and distance among family members. 3. The pacifying role of sexuality, or the mitigation of aggres-

sion through characteristic gender behaviour. 4. The pacifying role of co-operation and sharing. 5. In human families 'natural coalitions' (biological diads) differ from artificially created ones. 6. During family mediation the primary tool of influence is verbal persuasion. 7. During open ('honest') family communication family members verbalize what they feel, think, imagine, intend etc, and likewise listen, understand, interpret, appreciate etc what others state about themselves. 8. Cohesion is a central concept, since during reproduction conspecific 'outsiders' need to be found who will belong to the family following reproduction, regardless of how long this co-existence will last. In the process outsiders become 'familiar'.

Adaptive preferences for leg length in a potential partner: Report from 27 nations

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When different morphological traits are perceived as attractive (particularly when they are universally attractive) there are usually some biological explanations. For instance, more symmetrical faces are usually perceived as more attractive because they indicate developmental stability and higher immunological resistance and therefore better genes and higher biological quality. The attractiveness of women body shape described by waist-to-hip ratio (WHR) can be also explained by hormone profiles and higher potential fecundity. The main morphological trait that influences male attractiveness (at least in Western societies) is height. There is however no data elucidating the relationship between different components of height and physical attractiveness. In this presentation it will be shown how leg length influences attractiveness in men and women. Stimuli consisted of 7 different pictures of a man and 7 pictures of a woman in which the ratio between leg length and height was varied from average, by elongating and shortening the legs. 100 men and 118 women from Poland were asked to assess the attractiveness of the silhouettes using a 7-point scale. It was found that male and female pictures with shorter legs than the average were perceived as less attractive by both sexes. Although longer legs appeared to be more attractive, this was true only for the slight (5%) leg length increase; excessively long legs decreased body attractiveness for both sexes. In further research, 3103 participants from 27 nations rated the physical attractiveness of seven male and seven female silhouettes with different LBR. It was found that male and female silhouettes with short and excessively long legs were perceived as less attractive across all cultures. Results further revealed that worldwide, there existed a relatively similar standard of attractive LBR, independent of participants' and average population LBR. From the evolutionary and cultural perspective, we hypothesize that such preferences are generally determined evolutionarily because short and/or excessively long legs might indicate maladaptive biological conditions such as genetic diseases, health problems (cardiovascular disease and type II diabetes) or weak immunological response to adverse environmental factors acting during childhood and adolescence.

Is religious information special? Analysis of t-patterns in human interaction involving social information on religious background

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In this empirical pilot study, the Theme software is applied to the analysis of behavioural data collected from dyadic interaction (two people in informal communication). The main objective is to investigate the significance of social information of religious background in the structure of day-to-day interaction, viz. whether information of religious background is treated differently by human cognition than other social, background information of non-religious nature. Theme is built on a unique algorithm that searches for hidden repeated patterns in behaviour and interactions, based on a model of the temporal organisation of behaviour. It considers both the order and the time distances between behavioural event types as well as hierarchical organisation. The software behaves as an evolution program, in the sense that it detects complex patterns gradually as combinations of simpler ones and deals with combinatorial explosions through competition between patterns such that only the most complete patterns are retained (survive) while partial detections are discarded. Theme can detect complex repeated patterns that are hidden to observers and very hard or impossible to detect with other available methods (t-patterns are the subject of Magnusson's paper in the Biology of religious behavior symposium, "Patterns in religious behaviour"). In each dyad or pair, one participant is primed with social information about the background of the other (e.g. "person x is in denomination y"). Three conditions are applied: 1) Religious, where information on religious background is provided; 2) Secular, where information on secular background is provided; 3) Neutral, where no information is provided. If t-pattern formation is found to differ systematically in the religious and secular conditions, that conclusion can be reconciled both with the adaptationist and by-product stances on the origins of religion. If religion was instrumental in human, social evolution, e.g. with consequences for cooperation, human cognition might be adapted to pay more attention to social information on religious background than non-religious background information. Alternatively, the counterintuitive aspects of religion might by conceptual associations make religious information more relevant or attention grabbing.

The dynamics of smiles and brows

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The meanings attributed to facial expressions are often ambiguous. The perception of smiles, for example, varies greatly and can range from aggressive intentions and mockery to pleasant

feelings and seduction (Ekman 1985). Similarly, brow raising reflects many emotional states rather than being linked to a single emotion. Eibl-Eibesfeldt and Hass (1967) identified two basic brow movements - first, a very quick raising of the brow, the so-called "eye-greeting" (Grammer, Schiefenhövel et al. 1988), and second, a temporally persistent raising of the brows which is thought to express angry surprise and displeasure. Whereas research on emotion has been focusing on static facial expressions for the last decades, Krumhuber and Kappas (2005) – amongst others - recently suggested that the ambiguity in meaning could be owing to changing dynamics. We conducted two experiments to establish the influence of muscular dynamics on the perception of facial expressions. The first experiment focused on brow raising, the second investigated Duchenne smiles. We used 3D avatars created in Poser 5 and implemented Ekman and Friesen's Action Units (Ekman and Friesen 1978) as morph targets to manipulate the dynamics of these two expressions. Each expression was divided into three periods - onset, apex, and offset – whose durations were combined randomly. This resulted in 54 movies for both smiling and brow raising (27 male and 27 female stimuli). 511 participants (302 women, 209 men) ascribed meanings to the expressions by rating the stimuli on seven-point Likert-scales with 34 semantic differentials. The ratings of genuineness, coyness, aggression and negativity were composite scores of the respective items, whereas pleasure, arousal and dominance resulted from a principal component analysis (explaining 51% of the variance). Brows. A short onset of brow raises is associated with high arousal and pleasure. A long apex conveys coyness and low pleasure. The offset does not affect the meaning of brow raises. Smiles. In smiles, long onsets convey pleasure, genuineness and low aggression, whereas short onsets were perceived as negative, coy and aroused. A short apex communicates aggression and negativity and is rated as unhappy and false. Short offsets make smiles appear more aggressive. Our study shows that the dynamics of facial expressions add information missing in static configurations, which can lead to different perceived meanings. This indicates that dynamics do not only influence the attribution of an underlying emotion, but might be essential in decoding facial expressions. A next interesting step would be to combine different movements with varying timing to investigate possible interactive effects.

Part III

Wednesday, July 16th 2008

Plenary Session

20

The Production of 'Rambos': Parent-offspring conflict, male hierarchies and warfare in Papua New Guinea

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Population growth and the increase of young men in proportion to older men are associated with accentuated coalitional violence worldwide. Explanations in evolutionary biology often call on sexual selection theory: men competing to acquire reputation and resources to attract mates. Here I will propose that parent-offspring conflict provides a more powerful framework for understanding the course of coalitional violence. Older men seek to manipulate inter-group competition to provide optimal resources and security for their offspring and those of their close collaterals. In contrast, young men seek to demonstrate physical prowess and willingness to sacrifice for the group to reap individual reputation and rewards. In periods of demographic or technological stability, older men with control of resources, knowledge, and networks prevail. With rapid change, younger men are able to disrupt the male power hierarchy, generating chaos. I will draw on a case study from the Enga of Papua New Guinea to illustrate parent-offspring conflict in the context of warfare over 250 years of pre-colonial history and today when population growth and high-powered weapons have reversed the male power hierarchy. I will discuss the impact of having young men in the driver's seat, and what older men are doing about it.

Attractiveness and Mating 5 21

The sexy voice: Fluctuating asymmetry and voice quality

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The question what makes a face attractive has been subject to numerous studies. The characteristics of facial attractiveness identified so far can be described in four main categories: (1) symmetry, (2) averageness, (3) sex specific hormone markers, and (4) skin texture. It is assumed that bilateral symmetry represents an honest signal for developmental stability. Further, hormone markers are developmental handicaps, since they are developed under high levels of immune-suppressive sex hormone levels. Human preferences developed in the course of evolution as a means to estimate the mate quality of others. This project addresses the question whether voice quality serves as a signal for the above mentioned qualities as well. Based on the redundant signalling hypothesis we investigated the relationship between attractive voices and attractive faces. Rikowski & Grammer (1999) showed that facial attractiveness and body odour correlate positively. If attractiveness is an honest signal for mate quality, the signals within the n-dimensional feature space should correlate positively and compose a single ornament of mate value. The aim of this study was to identify the relation between facial attractiveness, symmetry, average, and hormone markers and voice quality. We propose: 1. individuals with high facial asymmetry have voices with fewer harmonious frequencies and more frequency fluctuations. 2. Basic frequencies, formant frequency, jitters and shimmer in the voice correlate with body characteristics and facial asymmetry. 3. Vocal hormone markers are correlated with hormone markers in the face. We collected data from 118 participants (59 male, 59 female, mean age=24,0). Four different sound utterances in German (numbers, words with vowels, words with short syllables and one question) were recorded. Subjects were photographed under standardized condition for the calculation of facial asymmetry. Body characteristics, such as height, weight, chest circumference, waist circumference, hip circumference, foot width, ankle width, knee width, elbow width, hand width, wrist width, ear height, ear width and finger lengths were measured. An index for overall fluctuating asymmetry was calculated from bilateral measurements in body and face. In the

next part the voices and faces were evaluated independently. Subjects were asked to assess the attractiveness and other qualities relevant for mate. The different types of utterances and the facial photographs were compared regarding their perception quality in order to test the redundant signalling hypothesis. Finally, the connection between the perception quality of faces and voices on one hand and facial, bodily and acoustic measurements was tested. Preliminary results (N=1952, mean age=25,3) show moderate inter-item-correlations between face and voice ratings. Only in opposite sex ratings the perception of voice and face show interesting connections. Our results suggest that the information decoded from the voice and the face differs; i.e. these two communicative channels are used to convey different dimensions of mate quality, and are not redundant signals.

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Changes in attractiveness across the menstrual cycle are detectable in multiple modalities

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Research interest in the topic of human concealed ovulation has recently increased, with several studies suggesting that the high-fertility phase of the menstrual cycle, when women are most likely to conceive, may be associated with increased rated attractiveness. Differences in physical attractiveness at the high-fertility phase have been linked to general behavioural changes, and also reported in a number of isolated physical characters, including facial appearance, clothing choice, and gait. However, the relative impact of different modalities (e.g. face, movement) in relation to judgments of attractiveness change across the menstrual cycle outside of the laboratory setting is unknown. We investigated the contributions of different physical modalities to overall attractiveness at high- and low-fertility phases of the cycle in a within-subjects design where women (both normally cycling, $n = 15$ and users of hormonal contraceptives, $n = 17$) introduced themselves to a video camera as they might do when meeting someone for the first time, speaking for at least 20 s. To reduce demand characteristics, the study hypotheses were not disclosed to the women. Judges ($n = 24$) perceived normally cycling women as more attractive in the recording from the 'high-fertility' compared to the 'low-fertility' phase of the menstrual cycle in a forced-choice paradigm. There was no effect of 'cycle phase' on the perceived attractiveness of women using hormonal contraceptives. In order to isolate the relative importance of the possible modalities in shifts in perceptions of attractiveness, we separated the video recordings into their component parts. A second group of judges ($n = 41$) selected the more attractive of high- and low-fertility recordings of: a neutral expression facial photograph concealing the hairstyle, a natural expression facial photograph revealing the hairstyle, a photograph of the upper body (without face, so highlighting

clothing choice), a muted version of the videotaped self-introduction, and the soundtrack to the video. Surprisingly, women at the high fertility phase were selected at approximately the same rate irrespective of whether judges were given the various isolated components alone, or had access to the more complete information provided by the video. This suggests that increased dynamic and multi-modal information as presented in a full video does not correspond to increased accuracy in detection of the high-fertility phase, and that there is a degree of complexity in the modalities in which fertility-linked changes in attractiveness can be detected. Further research should attempt to identify the actual fertility-linked changes in women that affect attractiveness judgments. Owen Aldis Award presentation.

Do females and homosexual males prefer masculine faces and voices?

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It has been suggested that some sexually dimorphic traits are perceived as attractive by individuals of the opposite sex. In women, attractive faces, voices and body types were repeatedly found to be related to femininity. Also in males several studies showed that females prefer masculine voices. Nevertheless, ambiguous results were obtained when investigating a possible link between the ratings of male facial attractiveness and masculine and feminine facial traits. Moreover, these preferences have not yet been studied in males whose sexuality is aimed at same-sex partners. Because both heterosexual females and homosexual males prefer males as sexual partners and also because homosexual men are supposed to show some feminine cognitive traits, one may expect that both women and homosexual men prefer a similar degree of masculinity in faces and voices of potential partners. The purpose of this study is to investigate the link between the ratings of male attractiveness (A) and masculinity-femininity (M-F) based on separated facial and vocal stimuli and to explore the possible correlation of such ratings by females and by homosexual males. We further investigated the attribution of sexual orientation (SO) and how it correlates with the other rated characteristics. Using the zero acquaintance method, facial photos and vocal recordings of 28 homosexual and 34 heterosexual males were rated by 60 women and 60 homosexual men according to their A, M-F and SO on a 7-point scale and then the ratings were transformed to z-scores. We found statistically significant inter-personal and inter-group agreement for all three characteristics (A, M-F, and SO) for both, facial photos and vocal recordings. Moreover, significant correlations were found between feminine looking faces and homosexual looking faces as judged by all raters; between feminine sounding voices and homosexual sounding voices as judged by all raters; between both homosexual and feminine sounding voices and their attractiveness as judged by all raters; and between heterosexual and attractive looking faces as judged by homosexual men. However, no correlation was found between visual and vocal ratings on any of the traits assessed. Moreover, actual SO of the targets as assessed by questionnaires did not correlate with attributed SO based on facial images and vocal recordings. Thus, both females and homosexual males rate A, M-F and SO of unknown males according to specific facial and vocal traits, but facial and vocal traits are independent of one another. Consequently, overall attractiveness thus seems to be a compromise between possibly conflicting judgments on different modalities. Furthermore, facial and vocal traits perceived as feminine were rated as typical for homosexual men

but they did not correspond to the actual SO of the rated men. This suggests a stereotypical attribution of male sexual orientation according to perceived feminine traits. At least when judging separated facial and vocal information this attribution is inappropriate. Interestingly, while voices perceived as feminine were rated as more attractive by both female and homosexual male raters, only homosexual raters judged faces of heterosexual men as more attractive. This suggests that in potential partners homosexual men prefer some feminine as well as some masculine traits, and their perception of attractiveness does not completely imitate female mate preferences.

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From biology to perception by way of the face: The role of geometric morphometrics in interdisciplinary ethological studies

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Biological anthropologists, human ethologists, and evolutionary psychologists all share an interest in the evolutionary forces and constraints that shaped and continue to shape our minds, our behaviors, and our bodies inside and out. Traditionally, studies of these forces proceed one domain at a time – a study of the effect of growth on behavior, for instance, would proceed either by the methods of auxology or the methods of psychometrics. Such a narrowing of methodology cannot be optimal – there must be methods for studies combining multiple disciplines, and there indeed are. A particularly useful scenario arises when variables arising in one domain (for instance, auxology) are wielded to explain variation in another domain (e.g., behavior ratings) by a causal path running through actual organismal form. The toolkit of geometric morphometrics (GMM) is a new set of coherent statistical methods for the analysis of Cartesian coordinate data in causal chains like these. The GMM toolkit, an adaptation of multivariate statistics and graphics to the study of phenotypic variation, has already proved of high value for the detection of form changes that owe to such biological factors as growth, development, or hormones. In this method, the relative locations of a set of individually identified points, or “landmarks”, are encoded in a set of ordinary variables that can then be regressed one by one on the factors that cause them or features of the systems that they are presumed to affect. Corresponding to any such set of regression coefficients is a surprisingly clear diagram style, the “thin-plate spline”, depicting their pattern in immediately interpretable terms as a grid transformation. When the underlying theory places organismal form in the middle of the causal chain, as the mediating variable between biological causes and psychological effects, the two sets of regression coefficients (one pointing “backwards” to biology, the other pointing “forwards” to behavior) can themselves be compared to see if they are aligned or

not – to see if they convey one connected causal process. Our talk will review two examples of this type of study, neither one yet published. In one, the ultimate biological causal factor is the testosterone-to-estrogen ratio; in the other, it is the simple fact of aging. (1) The testosterone-to-estrogen (T/E) ratio is thought to affect a range of male facial characteristics, and several studies have explored women's preferences for such "masculine" features. However, until recently, little was known about the actual way the T/E ratio affects facial form. The relative lengths of index to ring finger ("2D:4D ratio") can be taken as a proxy for fetal T/E, and studies using this ratio support claims of early androgen effects on facial features. In one such study, facial photographs of 30 British adult males were characterized by the form of landmark points. The grid displaying regressions of these coordinates on perceived masculinity and dominance (as rated by females) resembled that for the regression of the same coordinates on 2D:4D ratio but not that for the dependence of facial form on salivary testosterone. The implication is that the aspects of the male face that convey such relevant information as dominance may be determined very early, perhaps prenatally, via differences in androgen exposure. (2) Age is known to decrease attractiveness ratings; the following study attempted to isolate the facial shape changes that generate increases in rated age. Data for this study involved 115 ratings and 84 landmark points on facial photographs of 20 males and 20 females ranging in age from 20 to 70 years. The dependence of shape on (true) age, in both sexes, involves a relative enlargement of the lower face together with decrease of eye size, thinning of lips, and enlargement of nose and ears. The pattern is the same as that for the difference between average male and average female form, and, in fact, there is a strong correlation between age and perceived maleness for females, but not for males. In both of the studies reviewed here, the multivariate nature of GMM tools permits us to relate the effects of biological processes to the perceptions of the same processes. Not only can we thereby compare the reality of the processes to the way they are perceived, but also we can simulate new forms, and thereby test a wide range of current theories and speculations about the causes and consequences of human shape variations. The combination of inexpensive data acquisition, richly multivariate feature spaces, and evocative graphics makes the intermediating role of GMM an unexpectedly powerful tool in interdisciplinary studies of biological-cognitive aspects of human facial form and function. Acknowledgements go to EU FP6 Marie Curie Actions grant (EVAN) MRTN-CT-2005-019564 and to grant GZ200.093/1-VI/2004 from the Austrian Council for Science and Technology.

The facial expression of contempt

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The study of facial expression of contempt and of the decoding of facial expression of contempt has important implications with several theoretical issues (such as, among others, whether contempt could be considered a basic emotion). Ekman & Friesen (1986) showed that the dimpler (AU 14, according to FACS) is the pancultural expression of contempt; other studies showed that other facial expressions can be involved in the expression of contempt; we (Ricci Bitti et al, 1983; Wallbott & Ricci Bitti, 1993) found that raising the upper lip (AU10), tightening the eyelid (AU7) and lowering the lip corners (AU15) and other non facial signals play also a role in the expression of contempt. Recent our further studies will be discussed where we try to check whether other

facial actions , besides the dimpler, can express contempt and whether other non facial movements can contribute to contempt expression. The results of these studies seem to indicate that some AUs (i.e. AU7, AU10, AU 15), their combinations and some head positions (i.e. AU54) can also be considered as important clues in expressing and decoding contempt.

Humor, social networks and interpersonal evaluation in rural brazil

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The Encryption Theory of humor proposes that the structure of humorous production provides a channel for the honest signaling of personal features, which is proposed to have evolved to aid within-group assortment for long-term interaction partners such as friends or mates. Drawing on ethnographic observations, quantitative studies and in-depth interviews conducted on a collective farm in rural Brazil, this talk will present results exploring the relationship between the interpersonal evaluations of humor ability, other individual differences (such as friendliness, trustworthiness, and public respect), and the formation and maintenance of social networks. These results suggest that evaluations of humor are well-correlated with the structure and distribution of social relationships, demonstrating the relationship between humor and within-group assortment predicted by Encryption Theory, and casting doubt on theories of humor production which claim it indexes an absolute difference in cognitive abilities.

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Musical patterns in vocal expression of epileptic “frontal” seizures according to a neuroethological approach in man

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In frontal epileptic seizures particular vocal emissions are often accompanied by motor and body repetitive behaviours. These vocal outputs have been described as loud “cries” in comparison with patients’ normal tone of voice. The outputs are very similar across patients’ seizures even if months or years have been elapsed. Nevertheless a very few attempts have been so far produced to analyze if these vocal patterns represent or not organized sets of sounds. Examining the vocal emissions of 50 seizures belonging to 12 patients we could see that almost all the seizures present regular rhythmic patterns mostly binary, sometimes ternary. Melodic phrases and scales have also been discovered in some outputs. The presence of these almost musical patterns according to our point of view may be related to ancestral behaviours stimulated during the seizures in specific brain circuitry. Binary rhythmic patterns are strongly connected with heart beats and are often described in some clinical contexts as regressive sounds. According to a neuroethological approach we may speculate that these sounds have a specific emotional meaning concerning very basic and primitive expressions. These expressions are in fact often related to fear or other negative episodes and it is worthwhile to consider the associations of vocal signals with other expressive patterns. The presence of “musical” patterns may suggest that musical elements in human vocal outputs are often related to emotional expression as Darwin pointed out and may be found in some non-human calls. Our study may be a first step towards that direction.

Sexual selection influences on musicality: Musical cognition and person perception

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Evolutionary Musicology is a new discipline that focuses human music origins both in phylogenetic terms, in a comparative framework with vocal communication in other species, and in adaptive terms in respect to its surviving and reproductive values. There are few experimental studies testing adaptive function hypotheses about human musicality based on natural selection or sexual selection. One possible hypothesis, based on sexual selection, states that musicality acts as a mental fitness indicator that could be accessed and valued on partner selection and relationship maintenance. According to this hypothesis, musical cognition, viewed as cognitive modules specialized in processing auditory musical information, would influence person perception and partner preferences. It would be expected that person perception would be more influenced by musical listening in women, because they are more selective. We investigated the musical effects on person perception about people directly and indirectly related to a musical performance, according to the gender of the participants. 140 women and 60 men composed the three experimental groups: 1) 25 men and 48 women did not listen to any music and were asked to imagine the personal characteristics of the cd player designers; 2) 18 men and 40 women listened a music and also imagined the device designers' personal characteristics; 3) 17 men and 52 women listened the same music but imagined the musicians' personal traits. The musical piece chosen was "Rise & Shine" from the album "Back On Terra Firma" by Tommy Emmanuel, a guitar player. It is a short instrumental piece and little known in Brazil. The participants answered a questionnaire judging the music (only group 2 and 3) and judging the imagined persons, moreover they reported their own level of musical appreciation and expertise. Men and women didn't differ in the musical judgment measured by adjectives. With respect to their own musicality, women reported more music appreciation than men ($p=0,019$). Listening to the music influenced the person perception of the imagined cd player designers by the women, on the items: "healthy" ($p=0,001$), "empathic" ($p=0,005$), "ecologic" ($p=0,001$), "cool" ($p=0,008$), "companionship" ($p=0,012$), "affectionate" ($p=0,034$) and "tall" ($p=0,030$). This effect was higher, on both sexes, when the musicians were imagined. Among women, the valued items were "good sense of humor" ($p=0,027$), "skilled" ($p=0,041$), "gallant" ($p=0,004$) and "affectionate" ($p=0,025$). Men valued the items "good sense of humor" ($p=0,003$) and "empathic" ($p=0,035$). Although men and women judged the music in same manner, as predicted, women enjoyed music more than men and had their personal judgment more influenced by musical listening, both thinking on device designers and musicians. These results could be explained by female higher selectivity of males, due to higher parental investment, females being more sensitive and judgmental on aspects of the phenotype and behavior of the male, including musicality. The improvement of the judgment was always related to musical listening. And the influence of music listening on person perception was higher towards the musicians than towards people not related to musical production. Moreover, the items valued by women were related to personal characteristics valued on mate selection, such as skill, humor, gallantry, affection. These data support the idea of musicality as a fitness indicator, suggesting evolutionary influences of sexual selection on musicality. These conclusions make sexual selection a promising field for

future research about adaptive functions of human musicality.

Sex differences in spatial cognition among Hadza foragers: A reconsideration of the gathering hypothesis

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Men and women differ in spatial abilities and navigational styles. One popular explanation holds that superior male spatial ability evolved in response to the navigational challenges of hunting mobile prey, whereas a female advantage in object location memory evolved in response to the needs of gathering stationary plants (“gathering hypothesis”). These hypotheses have yet to be evaluated among extant foragers, and little is known about the real cognitive demands of gathering for a living. We are evaluating these and other hypotheses among Hadza foragers by looking for functional relationships between cognitive abilities, performance at more naturalistic tasks that might require these abilities, and behavioral outcomes in various domains. Thus far we have shown that a female advantage in object-location memory appeared only among young Hadza adults, while older women did poorly at this task. Yet preliminary data suggest that these older women excel at finding bushfoods, and that younger women rely on their guidance. Our data suggest, therefore, that doing well on our object location memory task does not appear to be important in the real-world task of gathering, at least among the Hadza. We suggest two explanations for this: (1) Because Hadza women forage in a group and information is shared, the benefits of experience associated with age may more than compensate for associated cognitive declines in an older woman. (2) Because spatial performance in women is enhanced by higher levels of androgen and lower levels of estrogen, and androgen/estrogen ratios increase with age in women, older women may be able to compensate for their declining object location memory by relying more on their intact geometrical visual spatial skills. In support of this, we show that the decline with age in object-location memory in women was not seen in our geometric spatial ability tasks (water-level, targeting, pointing). As expected, Hadza men do better at geometric spatial tasks than women do. In men, these abilities appear to be related to navigation (for example, men’s skill at targeting is correlated with their accuracy at pointing to distant locations). We are analyzing our behavioral data on hunting and navigation to see whether foraging range size and hunting skill are associated with greater performance at geometrical spatial tasks, and whether there are any direct fitness benefits associated with these abilities. Little is known about the cognitive strategies that would be important to people who rely on foraging for a living. Our interviews suggest that temporal variation is a significant challenge, and that older women excel in knowing which foods will be ready to harvest at what time in what local area. This does require that one be able to find the area (navigational ability) but it also requires a great deal of knowledge and experience about plant characteristics and how they change over time and with local conditions. Gathering is usually viewed as a static three-dimensional navigational challenge, but the greater cognitive challenge may be navigating successfully in a four-dimensional world that includes temporal changes in the spatial distribution of plant resources.

Using Second Life to explore human universals

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Validating online interactive communities for ethological research is strengthened through the systematic documentation of universal behaviors. As human universals stem from evolutionary pressures, and provide foundational influences on our behavioural choices, they should be demonstrated in all environments including online and virtual ones. Using a checklist of universal behaviors that apply to social contexts, researchers documented the behaviours evidenced in the online game Second Life. We chose this specific environment as it is well established, has a diverse user base of international users (1 294 660 users in the last 60 days), and has a flexible interface that permits users to adapt the environment to their needs. Our study examines how expected behaviours are displayed, and thus provides significant insight into the use of virtual environments for research. Many of the examined behaviors occur frequently, as expected, and in realistic ways, when the environment provides the means for the behaviour to be easily expressed. Complex social hierarchies, intra-sexual competition, and mate acquisition activities, among others, are all prominently displayed and easily observed. When the environment does not provide a means, other behaviors are adapted to accommodate the technological limitations of the gaming interface. Alternatively, as the Second Life environment is adaptable, some users will modify the virtual world in order to express desired behaviors. Popular and effective modifications are propagated across the user base and become an integral part of the gaming experience for most users. For example, we have documented the emergence of alternative cultures (e.g., 'neko' – humanoid cats), with significantly complex support for these cultures. We have also observed the expression of in and out-group dynamics, and clear 'racism' towards individuals that participate in this alternative culture. Furthermore, the removal of real world threats such as rape, unwanted pregnancy, or physical violence, has mutated some social norms. In particular, sexual activities of many forms are highly prominent and easily observed. Finally, some activities, such as childbirth, are seen only in highly abstract and unrealistic ways. A confounding factor exists when real life behaviours and situations are sometimes displayed or discussed within the game. For example, a player discussing their sister or brother is most likely referencing actual kin who may not even be aware of the game's existence. Thus, researchers must be aware that environments can often be used, not as a proxy for the real world, but as a means of collecting data in an interactive and social setting, but with some degree of anonymity. However, the anonymity present also permits users to be deceptive, as we have widely observed. In particular, deception concerning their biological sex by real life males is highly prevalent according to anecdotal reports of other users. Our findings suggest that virtual worlds are a valuable resource for observing and documenting human behavior, with many unexplored opportunities for the advancement of ethological study. Previous research has shown that users try to develop online depictions of themselves that are similar in appearance to their actual appearance. We have observed that, analogously, users will try to act online as much as possible like they do offline. When prevented from doing so, users adapt their behaviour to the environment, or their environment to the behaviour, depending upon trade-offs between the complexity of the behaviour and the difficulty of modifying the environment. As well, behaviours such as lying and sexual promiscuity have been found at elevated levels when normal and realistic limitations and constraints are removed. This presentation will educate researchers as to the differences we have found between real world and virtual environments, and will permit

more effective observation of online behaviours in support of ethological studies.

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Facial masculinity correlates with dominance in males

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It is widely believed that sexually dimorphic traits in human faces evolved due to sexual selection. Masculine characteristics develop during puberty mostly under the control of testosterone, which also has an immunosuppressive effect. Thus, it is expected that these traits will fully develop only in high quality males and that females will prefer masculine faces. However, empirical evidence on preference for facial masculinity is mixed. Some studies found masculine faces to be of higher attractiveness in but several other studies (particularly those using morphing techniques) found a modest preference for feminine looking male faces. These discrepancies were interpreted in terms of attribution of negatively perceived psychological traits such as aggressiveness or dominance to facially masculine individuals. Thus it is possible that masculinity is related to attractiveness rather indirectly due to higher dominance of masculine males. Previous studies found for instance dominant looking males (i.e. masculine) to receive a higher rank in the army or to start their sex life earlier. However, perceived dominance might not be related to actual dominance. In this study, we tested whether facial masculine traits are associated with any psychological characteristics in males. The target sample consisted of 69 male students whose facial images were obtained in both frontal and right profile view under standard conditions and with a neutral facial expression. They also filled in Cattell's 16PF questionnaire to assess their personality profile. Facial masculinity was assessed by trained physical anthropologist using anthroposcopic analysis. This approach is based on qualitative classification of various physical traits and thus captures more complex facial features compared to metric analysis. Ten traits which show a sexual dimorphism according to literature were chosen to create the masculinity index. These included: the size of arcus superciliares and glabella, chin width, height and chin profile, eyebrow thickness

and density, eye opening height, forehead profile and nose height. For each subject, we further obtained three saliva samples to assess their testosterone levels. We used the mean testosterone levels of these three samples for further analysis. Regression analysis with the masculinity index as dependent variable and individual Cattell's factors as independent variables found two significant predictors: Factor E (Dominance) ($\beta = 0.41$; $p = 0.05$) and factor Q3 (Self-control) ($\beta = 0.39$; $p = 0.05$). However, we did not find a correlation between the masculinity index or any personality trait and actual testosterone levels. Our results suggest that facial masculinity and the personality trait Dominance may develop in concert during puberty, supposedly under the control of testosterone. However, at least in a one shot measure these are not correlated with adult testosterone levels.

The myth of hidden ovulation: How the face changes during the menstrual cycle

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In many old-world primate species, the prominent sexual swellings indicate the most fertile stage and therefore serve as crucial signals for potential mates. In humans, on the other hand, no such obvious signals are known, which has led to the prevailing assumption that women's ovulation is concealed. In recent years, evidence of subtle changes throughout the female cycle has accumulated. Facial photographs of ovulating women are assessed as more attractive than those of women in the luteal phase. It has been hypothesized that this shift in attractiveness might be merely due to texture changes of the facial skin, such as decrease of pimples, or increased peripheral blood circulation. In this study we investigated which changes actually occur during the menstrual cycle and how they affect attractiveness. We recruited 20 young women (aged between 19 and 31) who reported to have a regular menstrual cycle and did not take any hormonal contraceptives. We took standardized facial photographs – neutral expression, eye height, facial ornaments and hair removed from the face, no make-up, 5m distance from the camera, evenly lighted – daily for 30 days. In a forced choice task, 50 male and 50 female subjects were presented with two photographs of each participant – one taken in the ovulatory and one taken in the luteal phase. The task was to pick out the more attractive, healthy, sexy, and likeable, of the two. We cut skin patches sized 150*150 pixels from the cheek and subjected them to the same forced choice task with slightly modified adjectives. Our findings confirm earlier evidence of increased attractiveness during the fertile phase. We measured the facial photographs by setting 72 anthropological landmarks and semilandmarks. We analyzed the morphological changes with Geometric Morphometrics. First, we calculated the Procrustes shape coordinates with a General Procrustes Analysis. With a shape space matched-pair principal component analysis we identified the main direction and size of the shape changes between luteal and ovulatory state. We show that jaw is broader and the distance between eyes and eyebrows is larger in the luteal phase, making the appearance of the face more masculine. In the ovulatory phase the lips are fuller and the whole face is less robust. We analysed the texture of the skin patches calculating co-occurrence parameters, such as homogeneity,

energy, entropy, contrast and correlation. The colour information was calculated in an RGB-space in terms of hue, saturation and intensity. Findings indicate slight colour and texture changes. In this study we show that ovulation is not hidden in humans, rather the signals are subtler than in other primate species. It further supports the redundant signalling hypothesis, proposing one type of information being communicated via different channels.

From Praxiteles to Picasso: What pictorial body representations can tell about the selective value of art.

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Art history and its objects are told to follow its own rhythms of stylistic variation, partially intrinsic and inventive, partially due to cultural change. In human body representation – pictorial and sculptural - clear patterns of variation however seem to guide cultural elaboration. Artistic preference for distinct sexual-specific body shapes on the one hand mirrors visual adaptations for the concept of the human body - shaped by sexual selection - and survive the manifold disguises and deconstructions of its representation through different cultural ages. Growing artistic interest in a greater variety of body schemes on the other hand may answer to a wider distribution of constitutional types in a large society based on the distribution of tasks - this being an effect of cultural selection. Both kinds of artistic representational patterns are discussed on the basis of differential preadaptations and their selective value.

Effects of socio-economic status and partner age difference on offspring count in modern humans

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Effects of socio-economic status and partner age difference on offspring count in modern humans Martin Fieder¹ & Susanne Huber² Following Bateman's principle, the mean lifetime reproductive success of males and females has to be equal, but the variance in lifetime reproductive success may be different between the sexes. The sex with the smaller variance of life time reproductive success will benefit by being choosier. This effect is stronger the higher the costs for reproduction are for the sex with the lower lifetime variance. Accordingly in humans, females are the choosier sex: they prefer high status men as well as men who are somewhat older than the females themselves as those males usually offer more resources and protection for the benefit of the women's offspring. As a consequence high status men as well as men who are older than their female partner are expected to have higher reproductive success. In line with this prediction, we

demonstrate both on basis of a society subset (university employees) and a representative sample of whole society (modern Sweden) that socio-economic status has a positive effect on male but not female reproduction. We further show that an age difference where the male is somewhat older than the female is positively associated with reproductive output of both men and women. Finally, on basis of census data from contemporary USA (IPUMS 1980), we argue that the modern fertility decline is not in contradiction with evolutionary assumptions but may be the result of evolutionarily acquired mate preferences.

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Romantic love empire in Italian and Brazilian couples: integrating evolutionary and cultural perspectives

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Sexual and cultural differences can provide several clues to query and explain some mate preferences and human reproduction. This research compares and discusses men and women attitudes in romantic relationships through diverse multifaceted questionnaires that assess different aspects of Romantic Love. For this complex discussion evolutionary and cultural explanations were taken, verifying their several influences and intersections. Participants were 164(n=328) and 117(n=234) engagement couples, some months before their marriage, in Roma and São Paulo representing two cultures, with mean age of 33.4(SD=5.9) e 28.7(SD=6.0), respectively. Sample was predominant Caucasian, single, and middle social class. In Italy was observed that 59.2% of the couples already lived together in an informal union before marriage, whereas in Brazil just 33% did. Related to some sex patterns in romantic relationships behavior no significant differences were found between Italy and Brazil, where men took initiative to the first date in around 70% of the cases, and couples took approximately 6 dates before have sexual contact, and men paid for major part or for all couple expenses in 50% of the sample, in both countries. These sex differences may give some clues about contemporary mate preferences and behaviors, what have been confirming evolutionary and cultural theories that associate it to different explanations but converging into the same predictions. Related to Attachment styles, the study used the Relationship Questionnaire (Bartholomew & Horowitz, 1991) and found one significant sex difference that men were more dismissing than women in both cultures. A significant cultural difference were found for Fearful and Preoccupied styles, where Brazilians showed higher scores than Italians, that will be discuss in terms of both theories. According to Love-styles, the study adopted a short form Love Attitudes scale (Hendrick & Hendrick, 1986). First, not surprising, results showed a strong predomination of Eros presenting very high scores in all sample, and permitting a partial comment that attitude's

couples about love, at least before marriage, are strongly based in passion, “chemistry”, and partner idealization. Significant sex differences were found for Storge and Pragma, where women showed higher scores than men, and for Agape men showed higher scores than women. Significant cultural differences were found for Storge, where Brazilians presented higher scores than Italians, and for Agape, where Italians scored higher than Brazilians. For Ludus was found an interaction effect between sex and country, with a sex effect in Brazil, where Brazilian men showed scores significant higher than Brazilian women, and also occurred a cultural effect for men, with Brazilian men scored significantly higher than Italian men. Couple Satisfaction was another item assessed by the Relationship Quality components, PRQC inventory (Fletcher, Simpson e Thomas, 2000). Couples answers indicate a consistent high score in all sample with no significant differences related to the total scores, although a tendency could be observed to Italians showing higher scores than Brazilians, and women showing higher scores than men. Results seem give support to some evolutionary hypothesis in mating and also make researchers observe with caution through cultural variation that exists in different cultures. Most generally, these differences should be studied in more details for future researches in this area, and, why not promote some ruptures and develop a more complete and less limited explanatory account.

Do perfumes mask or interact with body odour?

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A number of studies have shown that human axillary odour plays an important role within social contexts. Evidence for the use of perfume to modulate body odour dates from ancient times and remains widespread in current Euro-American culture. Despite this, little is known about the interaction between individual body odour and perfume usage. One possibility is that perfume may mask body odour, reducing body odour variance between individuals. Alternatively, body odour might retain its own unique signature even when mixed with perfume. If this is the case, then one might expect that ratings of perfumed and non-perfumed armpits from the same individual i) should correlate and ii) should be equivalent in terms of the variance of the ratings. In the first experiment, 7 male students applied a standardized amount of a specific brand of perfume to just one armpit, and fixed cotton pads in both armpits for 24h while adhering to dietary and activity restrictions. Odour samples thus obtained were transferred to lidded plastic sniffing bottles and rated, within 10h subsequent to collection, by 29 females. To avoid possible fluctuations in odour abilities across the menstrual cycle, all raters were users of hormonal contraception. Raters evaluated the odour samples on 7-point scales for pleasantness, attractiveness, intensity, and masculinity. The second experiment followed the same procedure, but used a different brand of perfume. Here, samples were supplied by 10 males and rated by 20 females. Firstly, paired-samples t-tests were used to compare ratings of perfumed and non-perfumed samples from the same individual. As expected, perfume influenced the quality of the body odour. In the first experiment, ratings of pleasantness and attractiveness increased significantly in the perfumed samples, and in the second

experiment, perfumed body odours were rated significantly higher with respect to all four rating scales. Secondly, correlation analyses were performed to compare perfumed and non-perfumed samples from each individual odour donor. A positive correlation was found in all four variables in both experiments: pleasantness ($r=0.33$; $p<0.001$ in both experiments), attractiveness (exp. 1: $r=0.32$; $p<0.001$, exp. 2: $r=0.21$; $p=0.005$), masculinity (exp. 1: $r=0.16$; $p=0.027$, exp. 2: $r=0.21$; $p=0.005$) and intensity (exp. 1: $r=0.45$; $p<0.001$, exp. 2: $r=0.14$; $p=0.065$). Rating variance did not differ between the two conditions (Levene's test of homogeneity of variance, $p>.05$). Our results clearly suggest that armpit odours are rated more positively when perfumed. However, our second analysis shows that perfume is not merely masking the body odour, but rather that some aspect of body odour quality is preserved. Thus, our results support the idea of perfume-body odour interaction.

Gift exchange between undergraduates in the context of mating and courtship behavior

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Mating and courtship behavior among undergraduates living in fraternities and sororities at a California university (USA) involves ritualized public gift exchange. Eight gift exchange weeks were studied among the members of one sorority of 150 members and 19 fraternities with between 12 and over 100 members each at the University of Southern California. The gifts that were sent and received by 23 women were tracked over the course of a semester. The weekly dinners were also observed over a period of 12 weeks. Heterosexual gift exchanges occur during communal weekly dinners in three main contexts: courtship, relationship maintenance, and in connection with recent sexual activity. Large groups of peers witness these exchanges, hence there is an aspect of display/signaling involved. The exchanges function both as displays of "ownership" over an individual's sexual rights and as resource signaling. Hence, the gift exchange system involves inter- and intra-sexual competition. Mate choice and mate selection is observed through the exchange of gifts in a kind of non-verbal communication between individuals. There is also an observed set of "rules" that function to facilitate the gift exchanges. The etiquette surrounding the giving and receiving of gifts is extremely important to the success or failure of a relationship in this community of college students. The failure to exchange between certain couplings may publicly signal the termination of a sexual connection between the two. Furthermore, the physical contents of the exchange can communicate the purpose behind the exchange. For instance, onlookers can make inferences about relationship status, sexual interest, and recent sexual activity through the announcement of the name of the "giftee" and through observation of the type of gift received. The most common gifts sent and received by both sexes are candy, alcohol, and the return of clothing left behind after a woman has slept overnight with a man. There are gender differences in the proscribed and expected behavior of the two sexes: Women may stay in fraternities overnight, but men are not permitted to stay in sororities overnight or permitted to go above the first floor at any time. Sexual activity by both sexes is publicly acknowledged and both men and women are applauded for their "hook-ups." Individuals largely limit their "dating" and courtship to other members of the "Greek" (fraternity and sorority) community, thereby creating an endogamous

mating system. The data from this study will be compared with data on other human groups and other species that engage in exchanges of sex and resources.

Marital Satisfaction and the Impact of Children in Collectivist Cultures: A Meta-Analysis

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A fairly salient finding in the literature is that the presence and number of children have a negative impact on marital satisfaction. Those that maintain an evolutionary perspective may find this result bewildering. It is argued that a couple that has successfully reproduced together ought to have heightened satisfaction. If one is considering life satisfaction, a positive relationship with the number of children emerges. It should be known that the majority of studies confirming this negative impact children bring have been on samples of participants from individualistic cultures such as the United States and Canada. This severely limits the generalizability of this finding. Twenge (2003) conducted a meta-analysis that consolidated the findings from 97 studies. Her analysis garnered close to 150 individual effect sizes. Indeed, Twenge was able to demonstrate that the presence and number of children negatively impact marriage satisfaction. A criticism of Twenge's meta-analysis is that it contained very few studies from countries with collectivist cultures. In order to determine the relevance of cultural type, collectivist and individualistic, we conducted a meta-analysis that aggregated the findings of around twenty studies that contained samples from collectivist cultures. All studies used in this meta-analysis contained samples from outside the United States. The purpose of this presentation is to discuss the findings from our meta-analysis on the impact of children on marital satisfaction. There will also be an exploration of how differences between collectivist and individualistic cultures could explain the present findings. It may be that collectivist cultures foster shared childcare within the extended family, and this arrangement buffers stressors that people from individualistic cultures are more likely to face. There will be discussion of methodological issues the results present. It is important for researchers to consider cultural definitions of marital satisfaction.

Individual differences in the perception of fairness and altruistic punishment

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Game theoretical models suggest that humans, when confronted with problems regarding cooperation or defection behave in an intuitive rather than logical fashion. For example, most human beings prefer rejection of an unfair offer and remaining with nothing at all than accepting it. Recent research has begun to unveil factors involved in complex decision making in situation of social exchange. It has become increasingly clear that humans possess evolved cognitive and emotional biases that guide an individual's actual behaviour towards cooperation, defection or even punishment of unfair behaviours. Empirical evidence comes from behavioural observation and brain imaging studies during performance of tasks involving decisions about the distribution of (virtual) goods, suggesting a neural network comprising parts of the frontal lobe as well as limbic structures. However, most studies that have experimentally investigated the biological basis of human behaviour in social exchange games report only group effects. By contrast, there is a paucity of research into individual differences, even though it is plausible to assume that differences in character and temperament as well as situational circumstances influence an individual's attitude towards cooperation. This study sought to explore individual differences in acceptance of fair versus unfair offers and in "altruistic punishment". Methods: We conducted an experiment in 20 healthy young adults (12 female) consisting of an Ultimatum Game (UG) and a Dictator Game with punishment option (DGP) of a third party. In the UG subjects acted as player who could accept or reject an offer by a virtual partner. In the DGP subjects assumed the role of a third party that observed an interaction between two persons who were taking part in a Dictator Game, one as proposer and the other as passive recipient. The third party had the option to punish the proposer for his offer by investing own money to reduce the proposer's pay-off. Every amount that was taken from the proposer was given to the recipient. Relation between the invested money and the amount taken from the proposer was 1:2, which means that for every 50 cent that was invested in punishing by the third party the proposer's pay-off was reduced by 1 money unit (MU) which was

given to the recipient. In both games, 44 trials were presented, ranging from fair splits (5:5) over (7:3) and (8:2) to the most unfair split of (9:1); thus, 11 trials per condition. To test the influence of individual differences in personality and temperament we examined Machiavellianism, justice sensitivity, verbal intelligence test and personality dimensions. Results: Results concerning the behavioural data in the UG were very similar to those found in other UG experiments (Falk & Fischbacher, 2000; Sanfey et al., 2003). Fair offers were nearly always accepted by the responder whereas unfair offers became increasingly unlikely to be accepted as they became less fair. In the DGP, the punishment-investment by the third party increased with the degree of unfairness of the proposed offer. Fair splits were nearly never punished, whereas splits of (7:3) were penalised in the way that both proposer and recipient received the same amount of money. Interestingly, third parties tended to reduce the proposers' pay-off to less than 5 MU in the most unfair conditions. Concerning the influence of individual differences on behaviour in the two games, there was a highly significant correlation between the attitude towards injustice against oneself and a low acceptance-rate of the highly unfair offers in the UG. Moreover, the attitude towards injustice against someone else significantly predicted the punishment-investment. General intelligence did not affect behavioural performance in either game. Contrary to expectations, no association was found regarding the Big Five personality dimensions or Machiavellianism with behavioural performance in the games. Conclusion: We could show that costly punishment by a third-party increases with the degree of perceived unfairness and also significantly correlates with justice sensitivity. No association was found between personality dimensions and behavioural performance in the games, which might be due to the homogeneity of the sample.

Interpersonal cues to defection in a one-shot prisoner's dilemma game

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Previous work in experimental economics has shown that allowing individuals to interact face-to-face prior to playing a Prisoner's Dilemma game (PDG) enables them to predict with above-chance accuracy the game play of their interlocutors (Frank et al. 1993; Brosig 2002). Yet it remains unknown precisely which aspects of interactions—that is, which interpersonal cues—make possible such predictions. A separate body of research in social psychology has documented the rapidity with which individuals form relatively accurate first impressions of others along dimensions relevant to predictions of future behavior (Ambady et al., 2000), although the cues previously explored remain circumscribed and relatively low-level (e.g., attractiveness). A separate line of recent evolutionary theorizing predicts that culturally-situated traits and behaviors can serve as cues to norm repertoires or values (Fessler 2007; McElreath et al. 2003) and should be salient in naturalistic first-impression situations. The current study links up these heretofore disparate bodies of work using ethological methods within an evolutionary theoretical framework. Unacquainted participants from a US undergraduate population conversed freely in small groups for brief periods without knowledge that they would subsequently play a PDG with their interlocutors. Participants then played a simultaneous one-shot PDG with each of their interlocutors, and also made predictions about their partners' game play and answered a number of self-report questions. Pre-game interactions were videotaped and coded for various features, including postural mimicry, emotional expressivity, and violations of conversational norms. Photographic and self-report data were

also collected to assess participant attractiveness, skin color, and ethnic affiliation, in addition to socio-economic status and personality characteristics (e.g. psychopathic tendencies). We gathered additional data on the participants' impressions of their interlocutors and explicit justifications for game play decisions. We predict that various interpersonal cues will contribute to 1) overall predictions and 2) accurate predictions of interlocutor game play, and that these will only partially overlap with the largely untapped set of traits and cues that 3) objectively predict individual game play. Participant predictions and game decisions should also be partially mediated by perceptions of interlocutor traits (e.g., warmth & competence) and, at least for a subset of participants, will be predicted by personality traits. Such findings will be the first to connect specific interpersonal cues in brief naturalistic interactions with social impressions, predictions, and incentivized decisions, and will thereby contribute to the development of a robust, evolutionary science of human social interaction. Note: this research is supported by a 2007-2008 Owen Aldis award to the first author; the research is in progress, but in accord with the stipulations of the award, I intend to present a progress report at the 2008 conference.

The error of God: Error management theory and the evolution of supernatural punishment

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The punishment of free-riders is widely regarded as central to the evolution of cooperation, but the problem of who takes on the costs of punishment remains controversial. I have previously proposed that: (1) human cooperation is promoted by a fear of supernatural punishment for selfish actions (Johnson & Kruger 2004); and (2) such beliefs increased individual fitness because they reduced the probability of real-world detection and punishment for selfish actions (Johnson & Bering 2006). Here, I explore the role of "Error Management Theory" (Haselton & Nettle 2006) in the evolution of beliefs in supernatural agency. Error Management Theory, which is derived from signaling theory, suggests that if the costs of false positive and false negative errors have been asymmetric over human evolutionary history, then natural selection would favor a bias towards the least costly error (in order to avoid the worst error). So, for example, we have a bias to sometimes think that sticks are snakes (which is harmless), but never that snakes are sticks (which may be deadly). Applied to religious beliefs and behaviors, I derive the hypothesis from error management theory that humans would gain a fitness advantage from a bias in which they assume that they are being watched, judged, rewarded, and punished by supernatural agents. Although this may be costly because it constrains freedom of action and self-interested behaviors, it would be favored by natural selection if helps to avoid an error that is even worse: the detection and punishment for selfish behavior by victims or group members. If belief in God is an error, it may at least be an adaptive one. I present theoretical and empirical support for the hypothesis.

Part IV

Thursday, July 17th 2008

Plenary Session

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The Evolution of Morality: What is conscience good for?

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The biological evolution of moral, i.e. eventually altruistic strategies is conventionally explained with selective benefits for the altruists' genes. However, the well known evolutionary mechanisms of direct and indirect reciprocity and nepotism (kin selection) are only partly able to explain altruistic behavior because they neglect the paradox of conscience. This paradox arises, since crises of conscience do not contribute to selfish-gene benefits for the conscientious. Altruistic solutions to moral conflicts are costly and lead to personal disadvantages for one's own life and reproduction. In contrast, selfish solutions do coincide with feelings of guilt and shame, leading to fitness disadvantages in various ways, even including suicidal inclinations. It is precisely the absence of beneficial solutions to moral conflicts why we experience crises of conscience as dilemmas. But how could conscience have evolved by natural selection? I will argue that conscience does not serve the selfish-gene interests of the individual having a conscience but the selfish-gene interests of this individual's parents. Conscience evolved within the context of parent/offspring conflict over altruistic tendencies. As an extended phenotype (*sensu* Dawkins) of parental genes, parental control could still govern the offspring's behavior, although there were no longer any direct possibilities for parental manipulation. The talk concludes with possible social scenarios, in which parents may benefit by sacrificing part of their reproductive fitness requesting their children to behave conscientiously in order to maximize their own lifetime reproductive success.

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Male wealth and height predict self-reported orgasm frequency in a sample of Chinese women

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There has been considerable speculation about the adaptive significance of the human female orgasm. Scholars, such as Stephen J. Gould, have argued that the female orgasm is a mere by-product of the male orgasm. By contrast, others, such as Richard Alexander, have argued that the female orgasm exhibits 'design features' and can be meaningfully studied as an adaptation. Here, we test the hypothesis that the female orgasm promotes differential affiliation or conception with high-quality males. If the female orgasm plays a role in selection of high quality mates, then we expect a positive relationship between measures of male quality and female orgasm frequency. By contrast, if the female orgasm is a mere by-product then we would not expect a relationship between male quality and female orgasm frequency. We investigated the relationship between women's self-reported orgasm frequency and characteristics of their male partners in a large representative sample, the Chinese Health and Family Life Survey (n= 1,534). No study so far has studied the role of characteristics of male quality for female orgasm frequency using a population based sample. We used linear mixed models and event history analysis (Cox regression) to examine the role of male characteristics for women's self-reported orgasm frequency. Linear mixed modelling allows investigating the independent effect of a variable (male wealth / height) on a dependent variable (orgasm frequency), even if other variables are correlated with it by modelling covariance between independent variables. Event history analysis by Cox regression allows investigating how an independent variable influences the likelihood of an event (frequent orgasm) over time (sexual relationship duration). In the linear mixed model, we find that women report more orgasms the higher their partner's income, and, more weakly, the greater the height of their partner. Cox regression showed similar results. If their male partner was wealthy, women reported frequent orgasms earlier in the relationship than if their partner is not wealthy. Similarly, if their male partner was taller then women were inclined to report frequent orgasms earlier in the sexual relationship than if their partner was shorter. Yet, the effect of male height was considerably

weaker than the effect of male wealth in all analyses. These results are consistent with the view that female orgasm has an evolved adaptive function. The findings are discussed with reference to the current literature on human mate choice, pairbonding, sperm competition and male quality.

Daring to be darling: Attractiveness of risk takers as partners in short- and long-term sexual relationships

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In an evolutionary framework more frequent risk taking among young men than young women is explained by sexual selection. Risk taking among males can be a form of competitive advertising and can be seen by females as an honest signal of high biological quality. The research on risk taking as a cue in mate choice has produced equivocal evidence. Some authors claim that risk taking is a sexually selected signal of 'good genes' emitted by males and directed towards females, whereas other researchers conclude that risk taking functions as a signal sent by males towards their same-sex friends. What was neglected in the previous studies was the problem of the preferences for risk takers or risk avoiders in the context of two different sexual strategies. Our study aims to explore human risk taking in terms of long-term and short-term relationships. Additionally, it examines the influence of individual risk taking on reproductive success measured by the number of sexual partners in males. It also investigates whether people mate assortatively in terms of attitudes to various kinds of risk. Our subjects were 171 female and 189 male students who completed the questionnaire that included the revised Sociosexual Orientation Inventory (SOI-R scale), the DOSPERT scale (measuring individual level of risk taking in five domains of risk) and six brief vignettes which represented psychological profiles of risk takers and risk avoiders in three domains of risk: physical, financial and social risk. The data were analyzed using nonparametric tests such as Wilcoxon signed-rank test, U Mann-Whitney test and Spearman's Rank Correlation. Significant differences between the ratings of attractiveness have been found for long-term and short-term sexual partners. Both sexes rated risk avoiders as more attractive than risk takers in the context of long-term relationship. In contrast, for short-term relationships both women and men preferred risk takers over risk avoiders. More specifically, in the long-term context females were especially attracted to social and financial risk avoiders whereas both males and females regarded the financial risk taker as the least attractive partner. In the short-term context both sexes strongly favoured physical and social risk takers and females mostly disliked the physical risk avoider. We also found significant but moderate positive correlations between various kinds of risk taking in males and the frequency of using short-term sexual strategy. We did not find strong evidence that humans search for partners who are like themselves in respect to taking risks in various domains. Overall, the results indicate that risk taking might be a sexually selected trait, especially important in acquiring short-term sexual partners. Our study also demonstrates that different sexual strategies imply different preferences for personality characteristics related to the proneness of risk taking in the three risk domains. In essence, the results suggest that risk-taking in humans fits well in the concept of honest signaling and support the 'good genes' hypothesis. The findings

give a perspective to human mate preferences research by highlighting the necessity to distinguish sexual strategies wherever preferences for attractiveness of the opposite sex are measured.

Thematic Aperception Test (TAT) stories as a function of facial hair of characters and sex of respondent

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Physical appearance is a powerful potential source of information during initial acquaintance. Physical persona can affect people's impressions about another's attractiveness, personality, and even competence, intelligence and moral character. Stereotyping others is considered an inevitable human process that functions as a shortcut to evaluate others before more information is available. First impressions may change as more information is gained during subsequent contact. However a first impression may serve as a template, guiding the interpretation of subsequent information. Facial hair is one of the characteristics that may influence first impressions. Men wearing facial hair were seen as older than when clean shaven. Moreover, increased testosterone during puberty produces sexual maturation in the male face, growth of facial hair, and broadening of the chin. This maturity sign may have evolved as a signal of threat and dominance and an announcement of a male's potential for reproductive success. Beards could have evolved through sexual selection, as a result of female choice, or as a result of direct competition among males. The aim of our research was to study stories created in response to three TAT (Thematic Apperception Test) plates in their original version and in a "bearded modified version". The idea of this research was suggested by a heuristic article entitled "The survival value of beard" (1969 *Psychology Today* 3, 36-39). We focused on the IV (one man stands back to an older woman), VI (one man and a woman are embraced) and VII (an elderly grave-looking man is next to a young, clean shaven man) TAT plates. 356 undergraduate students with mean age 23.1 ± 1.9 (224 male and 139 women) saw the IV, VI and VII original TAT cards. Another group of 347 undergraduate students (229 male and 118 women) saw a bearded version of the same plates. On the VII plate the beard was drawn on the younger man. We analyzed the impact of facial hair on created stories focusing on: status (low, medium and high), type of relationship (work colleagues, kin relation or friendship), and quality of relationship (Positive or negative) between the characters on each plate. These characteristics of stories were evaluated by two judges and the mean kappa index was 0.89 ± 0.10 . Chi-square contingency analysis showed that the perceived status by both male and female participants changed as a function of facial hair on plate IV (male $p < 0.01$; female $p < 0.01$), VI (male $p < 0.03$; female $p < 0.02$) and VII (male $p < 0.003$; female $p < 0.001$). In original version of IV and VII cards, lower status was attributed to the younger character than to the older ones (both elderly woman and elderly man). In modified version, the addition of facial hair increased the status of the young man, equalizing the power relationship. However, a negative effect of facial hair was found comparing the original and the modified version of plate VI depicting a couple. The presence of facial hair reduced the status of the male character (Male $p < 0.003$; Female $p < 0.006$). The analysis of type of relationship showed sex difference. Whereas female respondents told stories with kin relations between the characters on all plates (IV $p < 0.04$; VI $p < 0.01$; VII $p < 0.03$), kin relations were less

frequent in the stories created by male respondents (IV $p < 0.485$; VI $p < 0.002$; VII $p < 0.331$). No differences were found for quality of relationship comparing clean shaved and bearded characters. Finally, we studied the association between all the categorical analysis variables together in a HOMALS perceptual map analysis. The categories of all variables were evaluated as a function of proximity in the bidirectional graph. Closer categories on the map have stronger association, suggesting a “profile” about the relationship between multiple variables. The “profile” yielded by HOMALS confirmed the chi-square results. Facial hair added on the younger man in the cards IV and VII, interacting with an elderly woman or man, increased his relational status. The opposite effect was found on card VI, depicting a couple. Our results are compatible with the ultimate interpretation that that facial hair evolved as a signal of threat and dominance. In the sexual selection context, the beard could have evolved as a threat signal through intrasexual selection and not through intersexual selection. In evolutionary history, women might have chosen to mate with mature dominant men despite and not because of their beards that could be excessively threatening. Male facial attractiveness is associated both with neotenous features such as wide eyes and with mature features such as a long and wide chin, prominent cheekbones, and thick eyebrows. The most attractive faces were intermediate, neither extremely mature nor extremely baby-faced.

Symposium: The biology of religious behavior: Religion from the perspective of human ethology 1

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The cultural evolution of religious behaviors in their socioecological contexts

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The Cultural Evolution of Religious Behaviors in their Socioecological Contexts Stephen K. Sanderson The long-term evolution of religion in world prehistory and history can be described in terms of a series of stages. Anthony Wallace has distinguished four stages, which he calls shamanic, communal, Olympian, and monotheistic religions, and Robert Bellah five stages, identified as primitive, archaic, historic, early modern, and modern. Shamanic and communal religions may be regarded as subtypes of Bellah's primitive religion. The shaman is the primordial religious specialist in human society. Shamans are especially characteristic of mobile hunter-gatherer societies; they cure illness, especially through trance induction techniques, intervene with the spirit world, experience soul flights, and engage in divination. Communal religions contain one or more of these types of magico-religious practitioners, plus bodies of laypersons who come together periodically for collective rituals. The two main types of communal rituals are totemic rituals and rites of passage. Good examples are the Trobriand Islanders, the Nuer, and the Tikopia. The Trobrianders have a major communal cult institution known as the Technological Magic Cult. Here persons carry out collective rituals presided over by a garden magician, who is likely to be the village chief, a canoe magician, and a fishing magician. Olympian and monotheistic religions are subtypes of ecclesiastical religions, which have full-time priests and religious doctrines that are often elaborate and recorded in sacred texts. Ecclesiastical religions emerged as societies evolved more intensive agricultural or pastoral subsistence practices, greater political complexity (chiefdoms or states),

and writing and record keeping. The first ecclesiastical religions were polytheistic (Bellah's archaic type). These religions had a pantheon of gods conceived to have human-like qualities, held in awe and given great reverence, and providing legitimacy and reinforcement for state rule. Religious action focused on worshiping highly specialized gods and calling on them for assistance in various endeavors, such as success in war. A variety of religious bodies emerged, each typically associated with its own priests and god. Polytheistic religions were also characterized by extensive sacrifice, both animal and human. Monotheistic religions (Bellah's historic type) evolved out of polytheistic or archaic religions during the first millennium BCE throughout West, East, and South Eurasia. The new religions were creations of religious literati or prophets, but in time they came to have mass appeal. In these religions, animal and human sacrifice declined or disappeared and religious action came to be focused on prayer and other forms of worship, the main object of which was salvation or release from earthly suffering. But despite these variations, there are a number of universal themes in religion. Scott Atran has identified four: (1) counterintuitive beliefs in supernatural agents, whether benevolent, malevolent, or neutral; (2) a close relationship between such agents and people's existential anxieties; (3) public displays of commitments that are costly and hard to fake; and (4) ritualized and often rhythmic coordination of the preceding in communal acts. The fourth of these is the most ethologically relevant component of religion. The classic religious specialist in the human ancestral environment, the shaman, constitutes the basic template of religious virtuosity. Shamans are found all over the world in most hunter-gatherer societies, and are widespread in simple and advanced horticultural, pastoral, and even intensive agricultural societies. Michael Winkelman and James McClenon have suggested a neurobiological basis for their performances, and McClenon provides an interpretation of how they could have evolved by natural selection in the ancestral environment. The prophets and priests that evolved later in evolutionary time shared much in common with shamans, and may be regarded as shamans transformed according to changing socioecological conditions. Together, shamans, prophets, and priests may be regarded as the fundamental types of religious specialists in human societies.

Submissive deference, emotion or talk? ethology and the search for a universal definition of religious behavior

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The goal of our paper is to advance efforts to identify what humankind has in common religiously through a discussion of the theoretical importance of distinguishing religious behavior in ethological terms. To do this our paper presents the results from a preliminary test of predictions from three hypotheses about what distinguishes religious behavior from other behavior. The three hypotheses to be tested will be referred to as the submissive deference hypothesis, the emotion hypothesis, and the talk hypothesis. The first hypothesis predicts that religious behavior always involves some submissive-like deference shown to a supernatural power, agent or deity. More specifically, it predicts that across all religions petitioning prayer behaviors consist of a locally chosen variation of the make-oneself-lower-or-smaller-or-more-vulnerable behaviors, which are

coordinated motor patterns associated historically with submissive deference. The second hypothesis predicts that religious behaviors are defined by their emotional charging rather than by their intrinsic properties. More specifically, religious facial expressions and body language can be distinguished because they differ from those under voluntary control. The third hypothesis predicts that religious behavior will be universally distinguished, directly or indirectly, by speech acts that communicate acceptance of supernatural claims. The three chosen hypotheses warrant testing because the behaviors predicted by them are often associated with what is labeled as “religion” or “religious.” The goal of our preliminary test will be to identify which, if any, of the predicted behaviors constitute a pathognomonic behavior that, if present, reliably indicates to an observer that this is religious behavior, regardless of what else may or may not also be present. Establishing what each of these hypotheses can contribute to a universally applicable behavioral definition of religion will make a major contribution to answering all four types of ethological questions about religious behavior: what is the behavior’s phylogeny? what is its ontogeny (development)? what are its (proximate) causes? and is the behavior an adaptation or does it have adaptiveness? The first two hypotheses see religious behavior as structurally defined. As such, the predicted behaviors will be universal and will not require learning unique to any particular culture. In contrast, the third hypothesis sees religious behavior as functionally defined. Functionally defined behaviors are structurally variable, and vary from culture to culture because they always require a culturally acquired component to be actualized. The research design of our initial test of these hypotheses involves showing images of behaviors conforming to the predictions of each of the three hypotheses to subjects who are then asked to identify which images are religious and which are not. To ensure that the images reflect fundamental and universal human behaviors in their natural habitats they will be taken from natural settings in a variety of both modern and tribal cultures from different parts of the world. To ensure the images conform to the predictions of each hypothesis, proponents of each hypothesis will be asked to approve the images that will count as confirming their hypothesis. The results of this, and subsequent, tests will help answer some of the fundamental questions raised at this conference. Finding that the first or second of the hypotheses are consistent with the identification of religious behavior will support the conclusion that religious behavior can be recognized universally by its structure without the incorporation of behaviors unique to any particular culture. Finding that the third hypothesis is the one most consistent with the identification of religious behavior will support the conclusion that the identification of religious behavior requires culturally acquired speech acts distinct to one particular language.

Natural gazes, non-natural agents: The biology of religion’s ocular behaviors

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There are two primary tasks the human animal must accomplish – survival and reproduction. Accomplishing the former facilitates the latter. In the environment of evolutionary adaptedness (EEA), humans faced several obstacles standing in the way of these accomplishments. Behaviors most efficient in negotiating such ancestral, environmental obstacles enjoyed greater reproductive success and thus adaptive fitness. Contemporary human behaviors continue to reflect this evolutionary history. Among the several behavioral suites the human animal possesses, social

behaviors proved and prove most efficacious for survival. The human animal is an irreducibly gregarious animal. As such, sending, receiving, and interpreting social information was and remains of paramount importance. Among the many ways humans engage in social communication, ocular behaviors are clearly significant. Employed in both bonding and agonal situations, ocular behaviors betray the intentions of both self and other. In this regard, ocular behaviors employ a combination of evolved cognitive modules: (1) the eye direction detector (EDD), (2) the shared attention mechanism (SAM), and (3) the theory of mind module (ToM). The ability to interpret the other's ocular behavior as reflective of agential intention is essential to the highly adaptive intentional stance. Minimally defined, religion is social intercourse with non-natural agents. Precisely in this regard, behaviors selected for natural, social engagements animate the religious world. I propose that there are three naturally occurring, social others that most influenced the selection of social behaviors and that these three ideal-type others provide the models upon which the fantastic world of religious agents is constructed. In the EEA, the three others that proved most significant for the human animal and his or her quest to survive and reproduce were (1) the attachment figure, (2) the intra-tribal rank-superior, e.g., "the king," and (3) the predator, conspecific or otherwise. Ocular behaviors and the attendant cognitive modules animating the engagement with these various natural others contribute to the variety of religious performances. Such ethological considerations suggest in this way a natural explanation for the various types of iconoclastic and iconolatrous religions. When deities are modeled upon attachment figures, e.g., primary caregivers, religious practitioners wish to exchange gazes with the non-natural other. Devotees and their attachment deities engage in what the self psychologist Heinz Kohut called "mirroring." In such exchanges – for example, Hindu darshan – the devotee wishes to be the object of the other's ocular attention. When deities are modeled upon the rank-superior, ocular behaviors adjust accordingly. Approaching the "regal deity" usually begins with an initial ocular submission, that is, a diversion of gaze. Often this original submission is then followed by ocular attention. Of course, when engaging in prayer – a type of petition – the devotee will close their eyes as not to be "seen" inappropriately and offensively demanding the superior to capitulate to the request. Indeed, and as Eibl-Eibesfeldt notes, when engaged in addressing another, the addresser will avoid uninterrupted eye contact for such is seen as aggressive and dominating. Finally, predator deities command a different suite of behaviors. The "hot gaze" of the evil deity is to be avoided. Here the devotee clearly seeks to escape being espied by the divine other in the exact same way an individual avoids being caught in the predator's "crosshairs." I similarly argue that the "evil eye" is the predator's eye, in which case and in some cultures individuals are encouraged not to invest ocularly in their prized objects, e.g., their children, for fear of drawing the "jealous gaze" of the other. Here we find a clear instance of the shared attention mechanism. The Hindu mother, for instance, will not look at her infant for fear of drawing the predatory other's attention to the child. The variety of ocular behaviors deployed in religious fantasy are the very same behaviors naturally selected over millennia of human evolution to negotiate differing social bonds to significant others, both benevolent and malevolent. Based upon cognitive mechanisms selected for their capacity to infer the other's intentions as well as to advertise one's own, religious practitioners engage ocular behaviors in their fantasies regarding the behavioral inclinations of the non-natural agents. To look or not to look, to be seen or not to be seen, these are some of the behavioral questions informing religious fantasy and performance.

Theory of Mind

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Theory of Mind and affect: Influences of positive and negative affect on the mental state decoding abilities of brazilian subjects

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Theory of Mind (ToM) refers to the ability of ascribing mental states and emotions to other people to understand and predict their social behavior. ToM ability is an important human skill, and is considered an acquisition as important as language and bipedalism in primate evolution because of its function in the social environment. The ToM framework has been used to understand problems in social functioning in psychopathological conditions, like affective disorders. Current studies have shown that impairments in the ability to decode mental states of others are associated with disabilities in social functioning of patients with bipolar and unipolar depression. However, there are studies which found different patterns of results: some of them show relationship between dysphoria and enhanced theory of mind skills. This better performance of dysphoric individuals can be related to the emotional valence of the stimuli presented. While nondepressed individuals focus preferentially on positive stimuli, dysphoric or depressed subjects show an attention bias toward negative, as opposed to positive stimuli. Considering that affective components can influence the ability of decoding emotional stimuli and the importance of ToM abilities for the individual's successful social functioning, the aim of the present study was to evaluate whether and how Positive Affect (PA) and Negative Affect (NA) influence the mental state decoding abilities in healthy Brazilian subjects. We expected to find that akin to bipolar and unipolar depressed patients, subjects with more NA and less PA should show more impairment in ToM abilities, especially when decoding mental states that have positive or neutral valence. Since some studies showed that men and elderly people are less accurate in decoding nonverbal social stimuli than women and younger subjects, we considered possible effects of age and gender in the data analysis. Methods: Participants were 80 healthy volunteers (39 men) with a mean age of 41.5 years (SD: 21.1) without previous history of psychiatric disease. They completed the Brazilian Subjective Well-Being

Scale (SWBS) to assess the intensity of PA and NA; and Baron-Cohen's "Reading the Mind in the Eyes" (RME) test, to assess mental state decoding abilities. SWBS presents 47 positive and negative affects and asks subjects to indicate how participants have felt in the last week, considering the affects presented. RME test is composed by a set of 36 photos of pairs of eyes representing different emotional states. For each pairs of eyes displayed, participants had to choose, from four emotional states alternatives, the one that better represents the emotion portrayed on the eyes in the photos. We computed the accuracy in the decoding of pairs of eyes (total number of pairs correctly identified). We classified the stimuli used in RME into three emotional valence categories (positive, negative and neutral) in order to compute the accuracy in decoding positive, negative and neutral pairs of eyes. Emotional valence was classified based in a previous pilot study in which 32 nondepressed Brazilian subjects were presented with the same 36 pairs of eyes from the RME with the correct adjective. Participants ranked the stimuli for emotional valence on a 11-point scale, on which 0 = very negative, 5 = neutral, 10 = very positive. Results: Linear Regression Analysis revealed that high levels of PA predict a higher accuracy score of decoding positive stimuli in RME test ($p=0.02$), independently of the subject's age and gender. However, in subsequent analysis gender-specific and age-specific differences were observed. While NA score was not associated with decoding abilities in men, for women we found that high levels of NA predict lower accuracy scores of decoding positive stimuli ($p=0.03$). In addition, we identified that the interaction effect between sex and age predicted lower accuracy scores of decoding mental states: increase of age was associated with less accuracy for decoding negative ($p=0.01$) and neutral ($p=0.03$) stimuli in women, but not in men. Conclusion: Our results indicated that affective components can influence ToM abilities of healthy Brazilian individuals and that this influence is, in part, gender specific. We also found that PA and NA influence depends on the emotional valence of the stimuli presented. As hypothesized, high levels of PA were associated with better performance in decoding positive mental states. Concerning NA effects, high levels of negative feelings were associated with impairment in decoding positive stimuli in women. Among women, age effects on the decoding abilities were also identified. We concluded that among healthy subjects, as well as among psychopathological patients, affective components have an important role on ToM abilities and, consequently, on the successful social functioning of the individuals.

What is personal confidence?

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Personal "confidence" is a key to success in relationships, athletics, artistic expression, and overall personal effectiveness. Even more importantly, we interpret other peoples' social confidence as a signal of their trustworthiness, accurate memory, expertise, and the genuineness of their affiliative commitments. When lacking real data about these qualities, we often base our judgments primarily on others' confidence. This behavior is problematic. One, confidence is an unreliable signal of trustworthiness, and correlates only weakly with accurate memory, knowledge, and expertise. Two, it is easily faked in order to defect against others, and many people are easily duped. Three, we simply presume the concept as a given and rarely ask what "personal confidence" actually is, how it evolves, what functions it serves, and how it operates. A Google

search of “personal confidence” yielded > 130,000 hits, but asking about its nature or mechanisms yielded none. Hence, it is unexplored territory. This presentation challenges us to define personal confidence as an open question for human ethology. Several correlates are also suggested for study – (1) trust in oneself and others, (2) congruence between one’s projected image and actual behavior, (3) degree of emotional investment and (4) commitment to honor one’s affiliative agreements. All of these correlates are related, poorly understood, and equally problematic. These anomalies suggest that a degree of shared self-deception might contribute, over and beyond the probable function of confidence as an information-sparing heuristic. Do we humans collude with one another in order to promote an image, which correlates only weakly with objective reality? If so, then studying the informational heuristic by functional criteria will prove it to be suboptimal. We can then study the social functions of confidence, such as in-group affiliation and grounding in consensus behavior. Research paradigms from hypnosis, social sciences and neuroimaging can be applied.

Do dogs have knowledge of knowledge states?: Choosing between knowing and ignorant informants

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Humans are obviously not unique in being social. Crows, bees, rats, and many other species form social groups, usually because members of the group are close kin or because group members stick with others for their own gain - for example, reducing the risk of predation by hiding in a group (Hamilton, 1971; van Schaik, 1982). Though the ability to effectively navigate social interactions can bring substantial benefits, (in particular with non-kin) it is not something that comes “for free”—specific cognitive skills are required (for example, to engage in reciprocal altruism, generally agreed that you need to be able to recognize individuals, keep track of past interactions, etc.). Although research has started to uncover the basic cognitive skills necessary of sociality, we still do not understand what are the basic cognitive building blocks required for sociality to evolve. On the other side of the coin, organisms also face many cognitively challenging problems that are not strictly social in nature. For example, specific cognitive skills are necessary for spatial navigation, foraging, negotiating predator-prey interactions, and so on. In the case of humans, there has been considerable debate over the factors that account for our uniquely elaborated cognitive skills. On one account, it is social life that has favored the evolution of these skills. Others have proposed that other, non-social skills, like tool making and problem solving, are important. One reason that has been proposed to account for humans’ remarkable skill in social interaction, which in turn might have been a driving factor in the worldwide expansion of human populations, is the ability to attend to the attention of others, make inferences about the goals and intentions of others (Tomasello et al., 2005). In reciprocal altruism, for example, exchange is stabilized if parties can correctly infer each other’s intent to cooperate, and quickly unravels otherwise (e.g., Boyd, 1989). Arguably, humans are good at this kind of interaction because we reason beyond actions alone, to the cause and meaning of those actions. Human skill at making inferences about goals and intentions based on the actions of others is pervasive, developing early in childhood

(e.g., Lempers 1979; Butterworth, 1991) and extending beyond cooperation to realms such as language learning (Bates et al., 1995) and coordinated social interaction more generally (Desrochers et al., 1995; Tomasello & Camaioni, 1997). However, on tasks that are simple for human children to solve, adult chimps, our closest evolutionary relatives, routinely fail (Povinelli & Eddy, 1996). In order to understand why humans are so good at inferring the intentions and goals of others, we must do two things: 1) Identify the ecological and social contexts in which these skills evolved; in other words, identify their function in ecological and social context; and 2) Elucidate the information-processing features, or form, of the mechanisms involved. These two goals are mutually interdependent, because aspects of the information-processing form of these mechanisms are likely to reflect the functional contexts in which they evolved. Our current work has used, as a catalyst, the recent and extraordinary findings that domestic dogs excel but chimps and wolves fail, on tasks that require the inference of intention from observable behaviors (see, e.g., Hare et. al., 2002; Miklosi et. al., 2003). We seek to shed light on the nature of the adaptation in the domestic dog and whether dogs are simply using physical proximity cues alone or are they in any way, marking the possible mental state of the informant. Specifically, we tested whether dogs use the knowledge states of human informants when in forced-choice paradigm tests. Domestic dogs were presented with a choice between an informant who was involved with the hiding of food and another informant who was not in the room food was hidden. When If one informant is knowledgeable and one is ignorant, whom should dogs rely on more?

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Patterns in religious behavior

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This paper primarily concerns a particular type of repeated temporal patterns in religious behavior and possible biological roots regarding their form and function are discussed. Repetition is here a focal term as structural similarity and symmetry both presuppose repetition. This is in good accordance with the following words of F. Crick, (who with Watson discovered of the structure of DNA): “Another key feature of biology is the existence of many identical examples of complex structures.” (1989, p. 138.) Behavior is clearly a case in point while its patterning is often hidden from the naked eye or ear: “Behavior consists of patterns in time. Investigations of behavior deal with sequences that, in contrast to bodily characteristics, are not always visible”, the opening words of Eibl-Eibesfeldt’s “Ethology: the Biology of Behavior”(1970). Not denying, of course, the spatial aspect of behavioral patterning. The work behind this paper has primarily focused on the structure of both visible and hidden behavioral patterns and their detection. It has led to the definition of a general mathematical pattern type, called a t-pattern, (and corresponding detection algorithms) apparently highly characteristic of human and animal behavior and interactions. The definition relies on repetition and focuses simultaneously on the order of pattern components and a particular relationship between the real-time distributions of the components when they occur independently of such patterns (Magnusson, 2000). Search for this kind of patterns has led to the detection of a multitude of otherwise hidden patterns in neuronal, animal, and human interactions (Anolli et al, 2005; Magnusson, 2004, 2006). Unexpectedly, recent application of the same pattern detection algorithm to DNA analysis has brought attention to spatial patterns of the same type in DNA molecules, notably, patterns corresponding to genes. Repeated rituals characteristic

of religious behavior appear to be clear examples of this kind of pattern. Apparently, functional symmetries also exist between such patterns in DNA and in human social and religious behavior (Magnusson, 2005). The t-pattern type will be described and illustrated with examples from both religious behavior and DNA.

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The phylogeny of religious behavior

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Religion can be divided into religious behavior, beliefs, values, moods, and feelings. Within this division, religious beliefs, values, moods and feelings would be contributing causes of religious behavior, where behavior is defined simply as the movement of individuals. The question is whether or not religious behavior, the topic of this Symposium, has a phylogeny or an evolutionary history such that the same or very similar behavior can be seen in our non-human relatives. Human behavior in general and religious behavior in particular (other than simple reflexes) can be

divided into two categories: Type I: structurally defined, mood dependent, coordinated motor pattern behavior and Type II: functionally defined behavior, which is all other human behavior. This division of behavior is important because, as will be seen, only Type I religious behavior can have a phylogeny. Type I religious behavior can be seen in the non-vocal aspect of petitioning prayer where each religion uses a slightly different version of make-oneself-lower-or-smaller-or-more-vulnerable. This particular Type I behavior can be traced through phylogeny to the earliest ground dwelling vertebrates. We know from Ethology that in all ground dwelling vertebrates the mood (a specific internal readiness to act) which lowers the threshold for execution of the make-oneself-lower-or-smaller-or-more vulnerable behavior in response to punishment (actual or impending) is fear. In humans it is a reasonable presumption that fear (or anxiety) also lowers the threshold for this behavior to be executed when it is used in the non-vocal aspect of petitioning prayer. Because there is a consistent and predictable anatomical link from specific DNA through specific innate releasing mechanism (IRM) to specific behavior, Type I religious behavior could act as a natural selection proxy for the DNA which coordinates it. As such, the non-vocal aspect of petitioning prayer has a phylogeny, could be the metaphorical object of natural selection, and therefore could have evolved by natural selection. There are many more Type II than Type I behaviors (the movements of individuals) used in religious expression. Examples of Type II religious behaviors include all of the behavior used in the reciting or reading of sacred narratives in the local language and almost all behavior used in religious rituals and ceremonies. Type II behavior, which varies in form and is functionally defined across different religions, is not a species-universal, structural design feature which could be the metaphorical object of natural selection. Type II religious behavior per se can be neither a phylogenetic adaptation nor have a phylogeny. However, the structural design features in the brain which are not concerned with movement per se but which motivate Type II religious behaviors are composed of consistent and predictable structural design features. They therefore can be the metaphorical objects of natural selection, can be phylogenetic adaptations and can have phylogenies. They therefore can evolve by natural selection. They include the phylogenetic adaptations in the brain which are structurally modified through contact with specific religious beliefs, which create religious value systems, modify the form of behavior through learning, generate reasoning, allow one to experience feelings and be spiritual and creative. Most importantly, they are associated with the capacity for symbolization by which specific meaning is attributed to objects in the material world. It can be observed that the societies of the world both in the east and the west whose religions contain the most elaborate Type II religious behaviors, especially written religious narratives, are the societies in which individuals within these societies have the most accomplishments in the arts, mathematics, and the sciences. However, the relationship between the richness of Type II religious behaviors and a society's intellectual and cognitive accomplishments is only a correlation which does not indicate cause and effect. The use of Type II behaviors could have come into being first in a non-religious context and the richness of Type II religious behavior in religion could have followed. However, if religion came first, say starting with Type I religious behavior and evolving to Type II religious behavior, especially through symbolization, then much of higher human cognitive and intellectual development may have evolved as by-products of religion's evolution as Type II religious behaviors were executed and that which caused them were subject to selection. There are, to the author's knowledge, three competing bio-behavioral theories of human higher cognitive and intellectual evolution. The first was Richard Alexander's social competition theory in *Darwinism and Human Affairs* (1979), the second was Geoffrey Miller's sexual selection theory in *The Mating Mind* (2000). Now a third theory can be added related to religion's evolution. None of these three theories of human intellectual and higher cognitive evolution are incompatible. All are plausible and all could have been operative. Of historical interest is that if this third, religion-came-first theory were correct, then

the traditional religious conceptualizations that higher cognitive and intellectual abilities are “gifts from God” would need to be restated as “gifts from belief in God.” It is, of course, from this latter “gift” that the various sacred narratives in the world’s great religions have been written. This third theory of course begs the more important question of why humans believe in God. To many true believers this answer is self evident. To others it is yet to be discovered. However, the phylogeny of religious behavior most certainly started with the Type I make-oneself-lower-or-smaller-or-more-vulnerable behavior associated with the non-vocal aspect of petitioning prayer. It can therefore be predicted that whenever individuals relate to a higher power, deity or God, such behavior will be executed. This is where religion, with all its current splendor, glory, and complexity, had its humble origin.

Behavior biasing religious beliefs: proximate mechanisms and adaptive functions

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This paper proposes how and why humans harbor thought-provoking, behavioral-biasing religious beliefs in the absence of hard evidence or strong probability of their truthfulness. The main criterion for the brain acquiring and holding a belief is its usefulness, not necessarily its truthfulness. The human brain has evolved such that it believes things for which there is no hard evidence. This is especially applicable to religious beliefs. Based on the above, we propose an empirically researchable human model that is amenable to testable hypotheses and upon which the refutation of specific null hypotheses concerning human religious beliefs and behaviors can be tested.

Is Religious Behavior “Internally Guided” by Religious Feelings?

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Is religious behavior per se “externally guided,” by being an adaptation or having adaptiveness in the biological sense of serving human individual and social interests by improving survival and reproductive fitness? Said in more biological terms, has religious behavior ever been “externally guided” by being the object of natural selection? The alternative view to external guidance is that religious behavior is simply the external expression of the internally-guided human human needs for meaning or certainty, the quest for transcendence, hope beyond death, universal harmony, internal peace, forgiveness before intense guilt, quest for greater love, etc. As such, does religious behavior simply follow its own pattern not entirely related to the evolutionary process? Within this alternative view, whatever internally guides religious needs and leads to subsequent religious

behavior is the essence of religion. Several hypotheses are formulated which can be empirically tested in order to verify the usefulness of this model.

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Proximate causes of religious behavior: mirror neurons and spirit

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Religion is composed of religious behavior, beliefs, values, moods and feelings. There are aspects of religious behavior, such as prayer, ritual and sacrifice, which are social and relational. One aspect of these social and relational components of religious behavior is spirit, which is defined as the vital principle or animating force within living things. Cognitive theories of religion offer one set of hypotheses by which to understand the detection and representation of spiritual agents, and the social behavior that follows. This paper offers an alternative theory, based on contemporary neuroscience. It has been proposed that the mirror neuron system, which is implicated in the process of empathy, is activated by 'expressive' form generally – which is to say form, whether animate or inanimate, representational or abstract, that 'appears' to contain affect. As such, the sight of the downward arc of a willow tree branch can induce an empathically related feeling of sadness, like that of a down-turned mouth. It has been further proposed that, as in the observation of meaningful movement, motionless, but dynamic-looking, form can activate mirror-neuron-based motor simulation programs and their associated feeling states – which underlie action understanding and implicit assumptions of action intention. These two automatic and unconscious processes, empathy and motor simulation, are hypothesized to result in the implicit attribution of emotion and mindful intent to form, as well as the felt experience of interpersonal relatedness; and it is the view of this paper these attributions and feelings are made to expressive and dynamic form in general, and not just to human beings. These feeling states and implicit attributions are given explicit meaning, which take into account culturally acquired schemas about objects and their meaning. The schemas held by many today are influenced by the materialistic worldview of science and

consumerism, which deny inanimate objects the possibility of spirit-life; and as such expressive and/or dynamic forms are not cognitively understood to be spirit. In addition, because culture and attention modulate empathy and motor simulation, these schemas presumably decrease mirror neuron firing activity – resulting in unconscious feelings that tend to confirm object schema. The feeling presence of expressive form is never altogether absent however. For indigenous peoples, on the other hand, no such prohibiting worldview exists, and for them inanimate form that ‘feels’ alive is consciously understood to be alive. The attribution is woven into a cosmology, resulting in an explicit narrative meaning that validates feeling experience, and increases empathic and motor sensitivity to inanimate form. And insofar these feeling states and experiences are laid down in implicit memory they are evocable by way of ritualistic behavior and so forth, resulting in the felt presence of spirit under a variety of circumstances. This empathy-based theory of religious behavior locates the mechanism for the detection of spirit firmly within areas of the brain involved in social processing. As such, feelings of spirit elicited by way of expressive and dynamic form, which function here as sign stimuli, initiate coordinated motor patterns associated with interpersonal behavior – for example, approach and avoidance behavior, pro-social behavior and prostration. These feelings and structures influence and underlie religious beliefs, which are not fixed according to this author, and thus vary from culture to culture. What does remain fixed though is the fundamentally social nature of spirit experience itself. For indigenous peoples, for example, nature is filled with spirit; and as such environmental resources are typically responded to via social behaviors like altruism, reciprocity and prostration – thereby, evidence suggests, enhancing environmental stewardship and secondarily group survival. The empathic/spirit experience of nature is thus presumably adaptive, and selected for. This theory suggests human beings not only have an inherent spiritualism, but a propensity to mediate spiritualism through the physical environment. We are predisposed to see God, if this theory is correct, not just as an abstract being, but as an empathically and dynamically felt presence in nature and form – insofar object schema do not inhibit the mirror neuron system. This propensity offers religious groups the opportunity to find common ground in the felt experience of God in the physical world, as some mystics have; and by so doing, have our behavioral response to nature modulated by way of empathy rather than the rule of law or self-interest – thereby enhancing environmental stewardship through pro-social behavior.

New religious behavior: a proximate mechanism for human group fission

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It is widely accepted by anthropologists who study New Religious Movements (NRMs) that the belief system of the new group has its origin in the revelatory experience of a single individual. The revelation consists of a rearrangement of existing myths and sacred knowledge, and is accompanied by a sense of mission to impart the revelation to others and to lead them to a “promised land”. There is a phase of exposition, in which the revelation is presented to existing group members, some of whom may accept the revelation as divinely inspired, in which case they become the followers in a cult or NRM. Then there may be a phase of proselytisation, during which the NRM becomes unacceptable to those who do not embrace it. Rejection by the main group, combined with a feeling in the prophet that the existing group is in some way evil and persecutory, and

added to the messianic urge to go to the Promised Land, leads to the geographical removal of the NRM to a new location, and a new independent group has been formed. This “heteropistic” (hetero = other, pistis = belief) splitting is additional to the “homopistic” splitting due to migration, colonization and the fission due to quarrels as described, for example, in the Yanomamo. This process requires two “dispersal phenotypes”: firstly the prophet who undergoes what ethnologists have called “primary maze-way resynthesis” in the development of a new belief system, and in this capacity he shares with the schizotypic who also has the capacity for change of belief system in the form of psychotic delusion; and secondly the follower who has the capacity to abandon the worldview in which he has been indoctrinated as a child, and to embrace what is often a bizarre set of new beliefs – in this capacity for religious conversion the follower has affinities with dissociative disorders, and indeed the followers of NRMs frequently indulge in dissociated activities such as speaking in tongues, possession by spirits, and experiencing seizures. The NRM differs from colonizing groups in a number of ways. They are less closely related genetically, as the prophet tends to extract young people from their families of origin. They may have a lower proportion of free-riders, as the capacity for religious conversion may be negatively correlated with the genetic basis of psychopathy. In the charismatic relationship which the followers have with the prophet, they are likely to believe that their migration is divinely inspired, and therefore have an enhanced motivation to bear hardship. The new moral code may give enhanced sexual opportunity to the prophet, if he is male, which may partly balance the loss of schizotypal genes in the failed prophets and in those sects whose beliefs lead to disaster such as group suicide. These theoretical considerations lead to some ideas for ethological research. We need to have more exact descriptions of the revelatory experience, the sharing of it with potential followers, and the geographical translocation which often follows. The followers who have already been studied for schizotypal traits need also to be compared to control groups on measures designed to detect free-riders; a reduced proportion of free-riders in daughter groups would promote selection between groups over selection within groups.

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The functions of religious fasting and feasting rituals: costly adaptive signals?

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There is hardly an aspect of human social relations not influenced directly or indirectly by the provisioning and sharing of food. Since food scarcity has been common in human history, communal norms for sharing the available food have always existed. Eating is a heritable, coordinated motor pattern that can take on a variety of different functions other than nourishment. The need for cooperative hunting, gathering and social consumption of food became so widespread that, on special occasions, feasting and fasting rituals achieved sacramental status. One of the best means

of acquiring high social standing was to be a net provider of food for others. Food generosity has been judged traditionally as a sign of good character; additionally, the denial of food by the high-ranking to subordinates has also been, like generosity, an effective means of establishing and maintaining prestige. From an ethological perspective, prestige can be defined as an individual's social standing that determines his/her ability to gain personal benefits by influencing the behavior of others. In addition to proximate benefits for those who accrue prestige in their lifetimes, there may also be ultimate benefits for descendants who by descent receive prestige from their ancestors (hereditary privilege). Within human communities, individuals with the most prestige will, on average, achieve the greatest descendent-leaving success. The underlying assumption in biological communication theory is that there are situations in which individual organisms benefit by signaling one another. This occurs when the messages exchanged contain vital information helpful for the survival and/or reproduction of the senders and receivers. Axiomatic to the theory of costly signaling is that signals will be perceived as reliable only if the costs to produce and send them are recognizably high. This paper is an attempt to understand functionally those religious behaviors called fasting and feasting. The adaptive value of these periodic rituals requires and selects for the entrainment of coordinated motor patterns between participating individuals. Studies have shown that future behavioral cooperation can be augmented through the shared sacrifice inherent in fasting. When individuals fast, their submission to the discipline of temporary food-denial communicates honestly to others a willingness to cooperate with genetic and metaphorical co-descendants of a common ancestor. In addition, the ability to withstand the rigor (handicap) of fasting displays an individual's healthfulness and vigor to both potential mates and competitors for those mates. Feasting to commemorate religious occasions, on the other hand, requires the manifest largesse of food donors. When altruists provide food (usually in excess) for communal festivity, relatively honest signals are sent to the grateful beneficiaries that elevated prestige for donors is fully justified. Fasting and feasting behaviors are reliable signals, adaptations that enable individuals to display reproductive value in the sexual selection process. By engaging in community sanctioned religious events such as feasting and fasting, one demonstrates a willingness to both cooperate with others through a traditional, coordinated eating pattern and compete with them for prestige and its rewards.

Cooperative punishment behavior and religion's role in the evolution of prosocial altruism

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The evolution of prosocial altruism (behavior that favors the group at a cost to the actor) within a group has been commonly approached as an instance of the 'public goods problem' or the 'free-riders problem', often referred to as the 'social dilemma'. The essential problem in a social dilemma is that each group member is tempted to act prosocially in order to reap the fruits of the social welfare resulting from the concurrent prosocial efforts of other group members, but more strongly tempted to spare the costs of prosocial behavior while still enjoying those fruits, so the predictable outcome is the disappearance, or nonappearance, of prosocial behavior. The occurrence of altruistic punishment (punishment of non-cooperators at a cost to the punisher),

through which individuals punish other individuals for failing to act prosocially, increase the costs of free-riding, and thereby improves the option of prosocial behavior. The problem is that altruistic punishment is also costly, so rational individuals would, again, be more inclined to let others assume the costs, while still enjoying the fruits of the resulting prosocial behavior. If human groups are able to display co-operative punishment (i.e. group punishment), and sustain it for long periods of time, they would be curbing the biological fitness of congenital free-riders, while raising the biological fitness of congenial altruists, creating the perfect environment for the biological evolution of prosocial altruism. Religion, we propose, could have played and may still play such a role. Using the agent based computer simulation model Sociodynamica we show that the successful enforcement of social norms, required for the evolution of pro-social altruism, is highly dependent on keeping punishment costs low, on the one hand, and punishment effectiveness high, on the other, thereby increasing the cost-effectiveness of punishment. That is, the cost/benefit ratio of punishment is critical for its evolutionary establishment and maintenance. One way to reduce this ratio is to distribute the costs of punishment evenly among all group members. This solution however is sensitive to the ability of the group to reach all free-riders for eventual punishment. Experimental results with the simulations show that if punishment costs can be distributed among group members, the establishment of pro-social behavior can be assured if at least 60% of the individuals in the population are susceptible to receive punishment, Co-operative punishment may reduce the costs of punishment as a consequence of the synergy that typically results from co-operation. When one individual tries to punish another individually, a strong resistance may be expected, to the point of causing considerable damage to the punisher. But when several individuals punish someone co-operatively, resistance may be expected to fall dramatically. Co-operative punishment may also increase the effectiveness of punishment as a result of the combined capacities of all society members in monitoring individual behavior, making it possible to detect infractions in a way that freelance punishers could never match. Several human institutions promote social cohesiveness. Among them, religions seem to be especially efficient in reducing the cost of co-operative punishment and in increasing the cost to the punished. Intuitively it seems obvious that religion makes exclusion from a group much easier (excommunication for example), which in turn elevates the costs to free-riders by making access to communal benefits impossible or much costlier. For example non-compliant individuals are not allowed to marry, to attend communal water holes, participate in social activities, etc. Individuals excluded from the monopolistic religious groups in small societies where anonymous existence is impossible have often to emigrate. That is, we predict that religions have to be intolerant and dominant in order to work effectively. On the other hand, religions reduce the cost of participation in co-operative punishment as enforcers of punishment in small communities have no need to engage directly with the punished free-rider but have only to follow the crowd, which in itself is less costly than to decide for him. Of course, the cheapest way to inflict the maximum punishment is to assert that God will punish with eternal hell. We predict then that successful religions will not favor individual creative initiatives and will promote herding behavior. A preliminary survey of dominant religions seems to be consistent with these predictions.

Religious behavior and cooperation: Is religion an in-group marker?

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Relationships between human evolution and religion are well known and widespread. An evolutionary hypothesis suggests that religion-related behaviors represent a human adaptation, growing within the social context of cooperation. Thus, religion could be considered a kind of “social glue” giving support to identity, cohesion and cooperation within groups. From a proximate point of view, Brazil presents an extremely interesting and particular religious social configuration. This nation is probably the most important catholic country in the world, although a surprisingly little proportion of Catholics attend religious services regularly. An increasing success of other cults, such as the evangelical one, has occurred recently in Brazil, but the number of atheists is proportionally very low. This particular arrangement of religious groups offers an interesting framework to analyze the modulation of social cooperation between atheists and evangelists. The aim of the present research was to empirically test the hypothesis that religion provides a support for in-group cooperation among individuals, acting as a very good in-group marker. To this purpose, through the administration of an online-game mainly focused on indirect reciprocity, the cooperative behavior of religious and non-religious subjects was investigated analyzing also the effect of pertinence to a group in the cooperative behavior of the subjects. Participants were selected on the basis of their opposite levels of relation with religion: 43 evangelist and 43 atheist subjects, with a mean age of 25.77 ± 7.66 years (54 male and 32 female). All the subjects participated in an online game where different profile cards were submitted to their attention presenting data relative to other participants (nickname, religion and instruction level). The aim of the game was to collect the higher possible number of tokens. Access to the online game was granted by a personal password and participation was allowed only once. For each subject, following collection of explicit consensus and personal data, the rules of the game were presented. During the game, each subject faced four other virtual opponents. Subjects were requested to interact with the virtual players and to choose a specific player to which they could donate tokens. Each player started the session, which lasted 5 rounds, with 20 tokens. To privilege indirect reciprocity, donations could not reciprocally occur between each pair of individuals. Importantly, participants did not know that the other four players were virtual, and that their donation patterns were previously established. In each session the four virtual players were 1 catholic, 1 evangelist and 2 non religious. Donation patterns were established so that 43 subjects confronted religious opponents donating 60% of their tokens and non religious players giving only 20%. Another 43 subjects were in the opposite situation where the ratio was 20% of donations from the religious players and 60% from the non religious ones. Our results showed that evangelist and atheists donated, on average, the same percent of their tokens on the first round and during the whole game. The direction of the donations, however, suggest that religion may act as an in-group marker: the first donation by evangelists was mainly toward another evangelist (GLM; $F = 4.32$; $p = 0.041$) and this was also true for atheists (GLM; $F = 5.86$; $p = 0.017$). The tendency to interact preferentially with players from the same group was observed for both evangelists (GLM; $F = 11.9$; $p = 0.001$) and atheists (GLM; $F = 5.57$; $p = 0.021$) during the whole game. Evangelists, nevertheless, made more donations to a fellow believer than atheists to other atheists, suggesting a more strong group cohesion (GLM; $F = 4.75$; $p = 0.032$). This was true both for the first round as well as during the whole game (first round: GLM; $F = 4.75$; $p = 0.032$; game: GLM; $F = 4.53$; $p = 0.036$). Players were influenced also by the generosity of the other players, donating more tokens to generous players, regardless of the religion. Taking all the results together, we observed that both evangelists and atheists showed the same cooperation rate. Variation was observed in the direction of the cooperation. Our results suggest that the subjects’ religion does not influence quantitatively their cooperative behavior but

the choice of the target of their cooperation. Our results provide support for the hypothesis that religion could be considered a good in-group marker, a signal of trustworthiness. These results fit well with one of the proposed functions of religion from an evolutionary point of view, that is, that religion may have evolved to promote cooperation among group members.

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A vindication of Eibl-Eibesfeldt's concept of 'Tötungshemmungen' (conspecific killing inhibitions)?: war atrocities, ethology, military psychology, and the neurosciences

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A vindication of Eibl-Eibesfeldt's concept of 'Tötungshemmungen' (conspecific killing inhibitions)?: war atrocities, ethology, military psychology, and the neurosciences By J.M.G. van der Dennen, Univ. Groningen Abstract (preliminary) In his famous "Krieg und Frieden aus der Sicht der Verhaltensforschung" (1975; translated in English as "The Biology of War and Peace", 1979) Eibl-Eibesfeldt postulated the existence in humans of 'Tötungshemmungen' (innate conspecific killing inhibitions). Man, like other organisms, has inhibitions against killing as part of a biological filter of norms. "Let us bear in mind, then, that individualized human aggression is effectively held in check by a number of phylogenetic adaptations. In all cultures there is a marked inhibition against killing a fellow human being, and if it is desired to ignore it, as in war, for instance, special indoctrination is necessary is the sympathetic appeal of common humanity is to be disregarded. Sympathy as the subjective correlative of the inhibition on killing is felt in all cultures, and is everywhere released by the same signals. Thus inhibitions on aggression are innate in us" (Eibl-Eibesfeldt, 1979: 100; transl. Eric Mosbacher). Many critics, such as Schmidbauer (1972), Sommer (1987), Vogel (1989), and others denied the existence of killing inhibitions in humans or in animals generally. Other scholars who have studied animal and human violence, such as Ghiglieri (1999) and Wrangham & Peterson (1996) have even suggested that humans are "natural born killers", or that humans have "adaptations for killing" (Buss, 2006). I present six arguments pro and six arguments con the concept of "natural born killers", derived from the study of warfare in preindustrial societies, combat motivation and war atrocities in contemporary soldiers, military psychology and psychiatry, and the neurosciences. Interestingly, recent publications (van der Dennen, 2006; Smith, 2007; Roscoe, 2007) have reasserted that powerful killing inhibitions exist in

humans.

Income and career choice: Analysis of Future Discounting from an evolutionary point of view

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From an evolutionary point of view, the ability to process environmental cues and to make more advantageous choices were fundamental during the human evolutionary process. In this sense, analyzing the circumstances and deciding to invest in lower short-term gains or risk higher long-term gains is one of the capacities of our evolved mind. The extent to which we opt for immediate gains over future rewards is known as Future Discounting. This perspective has been used to understand human choice behavior, and we suggest that it may be a useful tool for understanding career choice. The aim of this study was to investigate the relation between family income and career choice in individuals, based on an evolutionary analysis of Future Discounting. Our hypothesis was that individuals from families with different monthly incomes will show career options that reflect their willingness to take risks regarding the time and difficulties involved in admission to university. Accordingly, we analyzed the official entrance examination data of UFRN (Federal University of Rio Grande do Norte, Brazil) for 2007. These data correspond to all 22,249 applicants who enrolled in the 72 courses offered at the central campus in Natal. We assessed career choice according to the level of entrance difficulty of each course, measured by the applicant/vacancy ratio and by the mean number of correct answers obtained by successful applicants on the previous year's examination. Thus, we investigated if there was a correlation between the course difficulty and declared family income of the subjects who enrolled in each of these courses. Family income was collected from 5 income levels, measured in minimum monthly wages (1 monthly wage \approx US\$0.00), and for each course the percentage of subjects in each income range was analyzed. Our results showed that the proportion of subjects in each family income range changed according to the level of course difficulty. We found negative correlations between the course difficulty and the percentage of subjects in the two lower categories (Pearson: $r = -.478$, $p < .001$; Pearson: $r = -.673$, $p < .001$, respectively), which shows that the higher the course difficulty (high demand and high mean number of correct answers), the lower the percentage of subjects in this income range. On the other hand, the difficulty level showed a positive correlation with the three highest income levels (Pearson: $r = 0.556$, $p < .001$; Pearson: $r = 0.643$, $p < .001$; Pearson: $r = 0.667$, $p < .001$, respectively). Thus, higher income subjects seek courses that require greater investment and performance than subjects with low income. We can conclude from these results that subjects that have different social incomes make different choices depending on distinct levels of entrance difficulty. Analyzing these findings from the Future Discounting perspective, we can observe that low family income subjects will choose courses with lower entrance difficulty as a way of discounting the future, that is, of achieving short-term low investment gains. Higher income individuals may bear the costs of long-term strategies, making higher investments and obtaining gains further into the future, when they choose courses with greater entrance difficulty, despite the possibility of having to wait another year for admission. In this study we observed that, in addition

to social, family and cultural variables, other factors, such as Future Discounting strategies may help us understand individual career choices.

Grandparental care, paternity certainty and their implications for matrilineal and patrilineal family systems

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Long lifetime, prolonged childhood, and the need of an intensive child-care are typical characteristics of homo sapiens that make the offspring care by close relatives such as grandparents of major importance. From an evolutionary point of view it is interesting which relatives have a special role as caregivers and which differences in kin caregiving exist. The more closely an individual is genetically related to offspring, the more this individual should be likely to care for the related child. The paternity certainty hypothesis in connection with the kin selection theory has been often used to explain the asymmetric caregiving of grandparents and aunts and uncles. In most societies, maternal women care the most and paternal men care the least for related children. Because of the paternity uncertainty in the paternal lineage, men and paternal family members should be more reluctant in childcare. However, recent research has found several discrepancies in the paternity certainty interpretation. In traditional rural Greece, for example, a patrilineal bias was found (Pashos 2000), i.e., contrary to the universal rule, paternal grandparents cared more for grandchildren than maternal grandparents. Therefore, other theories have been proposed to explain biased kin investment, such as more elaborated theories based on the paternity certainty hypothesis, and the hypothesis of matrilineal family ties. On the one hand, asymmetric kin caregiving behavior could be the result of differential paternal and grandpaternal reproductive strategies, where paternity certainty as a proximate mechanism could play a partial role. On the other hand, kin asymmetries could be explained by the stronger family bonds of women which result in higher matrilineal kin investment. Patrilineal social systems only superpose the effect of matrilineal family ties with an evolutionary strategy of investing in sons. The proximate mechanisms underlying biased kin investment are unclear. A central research question is whether the parent-kin relationship is an important link in the kin caregiving. A current study (Pashos & McBurney in press) shows that the parent-kin relationship is indeed closely linked to the relatives' childcare and explains asymmetric offspring care to a great extent. I will discuss whether factors such as paternity certainty influence caregiving behavior and hence the family system or whether the evolved social system shapes the caregiving behavior. A further question is how to explain patrilineal family systems, which differ in kin caregiving from the universal matrilineality. Research on the proximate mechanisms of kin relationships facilitates the evolutionary interpretation of asymmetric kin caregiving and, moreover, the evolution of social family systems in humans. Pashos A. & McBurney, D. H., Kin relationships and the caregiving biases of grandparents, aunts and uncles: A two generational questionnaire study, *Human Nature*, in press. Pashos, A., Does paternal uncertainty explain discriminative grandparental solicitude? A cross-cultural study in Greece and Germany. *Evolution & Human Behavior* 21, 97-109, 2000.

Exploring the universal features of the cardiac patterns associated to evoked infidelity

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Research in emotions has been inspired by an evolutionary approach for over a century. Patterns of different physiological activation due to the experience of basic emotions is widely described in the literature, and have been tested in varying contexts and cross-culturally. A recent study by Rainville et al. (2006), studied the cardiac and respiratory activity generated by evoking personal experiences of basic emotions (fear, sadness, happiness, and anger) which resulted in very well defined factors that differentiated the respiratory activity and heart rate variability associated to the memory of each basic emotion. At the same time, a recent claim by Sabin & Green (2005) has suggested that romantic jealousy and parental love are universal emotions characterized cross-culturally, which merits that they should also be conceptualized as basic emotions. Romantic jealousy conceptualized as the response to a perceived threat to a valued relationship with a romantic partner, should logically follow after experiencing an infidelity. The purpose of the present research was to explore the proposition that infidelity may have a particular cardiac pattern that would emerge by the recalling of a real situation in which an individual has been betrayed by a romantic partner. In order to explore this premise, a total of 16 individuals who could vividly recall being betrayed by a romantic partner in the past were recruited (11 women and 5 men). The procedure instructed participants to describe the autobiographical episode in which they were victims of an infidelity in as much detail as possible. Additionally, a romantic episode which evoked "love" was also described, in order to compare variability in cardiac measures due to both emotional conditions and baseline. On a second occasion (a day or so after the initial interview) the physiological recording (EKG) was assessed in the laboratory during the evocation of baseline, the infidelity, and the love condition. The results yielded significant differences in the physiological variables and no sex differences (possibly due to reduced sample size) for each condition. Increased mean heart rate variability (HRV) in both emotional conditions was higher for the infidelity than for the love episode. Decreased mean interbeat interval for the emotional conditions in comparison to baseline sustained the mean HRV finding. Furthermore, the pattern of variability found in the emotional conditions was reduced in comparison to baseline, based on SDNN (standard deviation of the normal to normal interval), and was also strengthened by high frequency variations in heart rate (RMSSD). The exploratory results analyzed in this investigation support Rainville et al.'s (2006) methodology for inducing emotional states, which may have a heuristic value for extending research in jealousy and infidelity from an evolutionary perspective. The evidence of cardiac patterns associated to the subjective experience of emotional episodes is in line with the proposed universal patterns of jealousy. The extensions and future lines of research of these findings strongly suggest that comparing real life episodes of non romantic betrayal and jealousy should also be considered.

Runaway social selection for displays of partner value and altruism

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Enormous recent progress in understanding the evolutionary origins of altruism has come from variations on the themes of kin selection, reciprocity, sexual selection, levels of selection and co-evolution. However, some aspects of human social behavior remain difficult to explain, especially emotional commitments to nonrelatives, and moral behavior that does not pay off. Such behaviors are as dramatic and costly as a peacock's tail. They may have a parallel origin. Just as being preferred as a mate increases fitness by increasing the number and quality of mates, being preferred as a social partner increases fitness by increasing the number and quality of social partners. Mary Jane West-Eberhard outlined this mechanism of selection in papers in 1979 and 1982 and gave many examples, including possible applications to humans. This presentation describes the mechanism in detail, reviews mathematical models and new biological evidence, and applies the theory to aspects of human cooperation and complex sociality that are otherwise hard to account for. Social selection is the subtype of natural selection that results from the social behaviors of other individuals. Competition to be chosen as a social partner can, like competition to be chosen as a mate, result in selection that shapes extreme traits. Mathematical models show that coevolution of a socially selected trait and preference for the trait can runaway to shape extremes that harm other parameters of fitness even while they give a net benefit. Traits that lead to being preferred as a social partner include having valuable resources and a reputation for bestowing them generously but selectively on close partners. The preference for such traits in social partners emerges directly from self-interest. The resulting phenotypic covariance between displays and preferences gives fitness advantages to both. The resulting runaway selection for displays of resources, offers an explanation for behaviors ranging from potlatches to conspicuous consumption and for prominent displays of altruism, and deep concern about reputation. According to this model, individuals should also prefer others who can intuit what they need, thus potentially explaining moral capacities, empathy, and theory of mind. An agent based model illustrates the exact conditions under which a Generosity trait can increase in frequency under different conditions. It demonstrates that a Generosity parameter that harms individual fitness in isolation can nonetheless give a substantial benefit even if partner choice is based on resource value, not on generosity per se. Even though they give a net fitness benefit, traits at the endpoint of runaway social selection can have substantial deleterious effects on other traits such as viability, ability to accumulate resources, or vulnerability to mental disorders. This may explain why disorders characterized by excess concern about what others think, such as social anxiety disorders, are vastly more common than sociopathy. Adam Smith famously observed that the economy served the interests of many not because it was designed to do that, but because self-interested choices created selection forces that adjusted supply and demand to provide the maximum utility to the maximum number of people. His observation can be extended to the biological selection forces that shaped human altruism. Self-interested partner choices may be the invisible hand that shaped capacities for commitment, altruism, and other prosocial capacities of the human social brain.

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