

EHBEA 2012 DURHAM

POSTER ABSTRACTS

#1

Sound Symbolism and the Bouba-Kiki Effect

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Objectives:

To conduct a systematic examination of the Bouba-kiki effect while simultaneously re-framing proposed explanations for its existence and linking those explanations to functional accounts of the value of sound-symbolic biases for learning and language evolution more generally.

Methods

A series of experiments investigating purported explanations of the Bouba-Kiki effect. Early experiments focus on replicating methodologies of previous research, while subsequent experiments move to novel methodologies that explore response biases more implicitly and tap into a broader range of potential participant responses.

Results

In contrast to previous research, results suggest that sound-symbolic associations between word form and object shape are not mediated by vowels alone, but rather, by vowels, consonants, and some interaction of the two in nonsense word forms.

Conclusions

The linguistic dogma of arbitrariness largely ignores the form that symbols take, treating their structure as unimportant compared to their conventional use. We believe this to be problematic, as sound-symbolic biases appear to have roots in the shared perceptual and productive architecture of humans and other animals. A careful examination of the Bouba-kiki effect allows us to link what we see as fundamental biases to claims about language more generally, dually tracing the developmental course of language acquisition within individuals while also informing interpretations of the emergence of language from earlier communication systems.

#2

The emergence of iconicity in language evolution

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Objectives

The relationship between linguistic form and meaning has long been characterized as arbitrary in modern linguistics. Nevertheless, recent research has begun to demonstrate the pervasiveness and psychological reality of non-arbitrary form-meaning mappings (i.e., *iconicity*). Despite speculation regarding the role of iconicity in language evolution, no research has directly explored the emergence of iconicity using an experimental approach.

Methods

The *Iterated Learning Model* was used to simulate language evolution: using a diffusion chain design, a participant learnt an initial language and the output of such learning became the learning material for the next participant and so on, simulating cultural transmission. Picture-string pairings composed the initial language: strings were neutral regarding iconicity (based on normative data) and pictures differed across three dimensions (shape-iconic dimension of interest, colour and texture).

Results

Converging measures (based on normative data) showed theoretically-meaningful behaviour regarding shape only, and supported the hypothesis that speakers' sensitivity for iconic correspondences strengthened throughout generations. While the initial language was iconicity-neutral, systematic mappings emerged at final stages of the transmission chain, more consistently between rounded shapes and rounder sounds.

Conclusions

Past research has long been speculating that iconicity plays a role in language evolution. The present experiment provides a first demonstration that iconicity, in the form of sound-shape correspondences, does emerge from a language with an initial neutral state. Apparently meaningless sounds spontaneously aligned with corresponding shapes and were transmitted progressively. Such systematicity could not be solely explained as a general categorization phenomenon because those correspondences followed cross-modal sound-shape correlates.

#3

Meaning spaces in the language evolution literature

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Objectives

Several recent studies have modelled the emergence of structured communication systems in populations of simulated agents or human participants (e.g. Kirby & Hurford 2002, Kirby Cornish & Smith 2008). In order to evolve a communication system, the agents or participants must first have meanings to communicate. In the majority of these studies, the meaning space is pre-defined, structured, and constant. These assumptions are at odds with recognised issues in semantics concerning the flexible nature of human meaning inference, where meaning is partly dependent on communicative context (Pustejovsky & Boguraev 1995).

Methods

A critical review examines the strengths and weaknesses of meaning spaces used to date in the language evolution literature.

Results

While studies such as those cited above have shown linguistic structure emerging from unstructured input, this result has been shown to be dependent on the pre-defined structure of the meaning space (Smith 2002, Tamariz 2011). Assuming this structure as given therefore ignores several important avenues of investigation, for example the possibility that this structure is not necessarily fully inherent in the world communicated about, but is partly built up by the selection of particular features as relevant in the context of communication.

Conclusions

There is scope for more attention to be paid in the language evolution literature to the flexible and context-dependent nature of real-world semantics. A method is outlined for investigating how communicative context may influence perceived meaning space structure and hence linguistic structure.

#4

The culture of the "Out of Africa Tribe".

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Objectives:

The recent "out of Africa" hypothesis proposes that a small group of *Homo sapiens* left Africa 80,000 years ago, and that the descendants of that group colonized the rest of the Earth outside Africa. In order to explore what culture may have had the "Out of Africa Tribe(s)", I have used genetic data like the mitochondrial haplogroups of different tribes of hunter-gatherers, and have correlated them with cultural behaviors.

Methods:

Using the genetic mitochondrial haplotypes as an evolutionary framework, I have studied the pattern of ritualized fights, archeological and ethnographical evidence for warfare, or the use of murder and suicide as a mean for conflict resolution among several tribes of modern hunter-gatherers throughout the world. This allowed the reconstruction of cultural evolution superimposed on current genetic and migratory data.

Results:

I find that hunter-gatherers that belong to mitochondrial haplotypes L0, L1 and L2 do not have a culture of ritualized fights. In contrast to this, almost all L3 derived hunter-gatherers have a more belligerent culture that includes ritualized fights such as wrestling, stick fights or headhunting expeditions. This appears to be independent of their environment because ritualized fights occur in all climates, from the tropics to the arctic. There is also a correlation between mitochondrial haplotypes and warfare propensity or the use of murder and suicide to resolve conflicts.

Conclusions: The evidence presented suggests that a tribe of belligerent people, possibly warriors, populated the earth out of Africa. Furthermore, the data implicate that the original human population outside Africa is descended from only two closely related sub-branches of L3 that practiced ritual fighting and probably had a higher propensity towards warfare and the use of murder for conflict resolution. This may have crucially influenced the subsequent history of the world.

Related references:

Moreno E. The society of our "out of Africa" ancestors (I): The migrant warriors that colonized the world. *Communicative and Integrative Biology*. Vol. 4, Issue 2 March/April 2011, 163 - 170.

#5

A Multi-ancestor Coalescent Theory for Cultural Evolution

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Objectives: To investigate the connection between historical demography and current patterns of cultural diversity.

Methods: Ideas from coalescent theory in population genetics are adapted to a probabilistic model of socially transmitted traits. The model follows the lineages of cultural traits backward in time to the point where multiple lineages join in a single individual. The model is distinct from existing coalescent models in population genetics in that individuals can have multiple ancestors, a fact that more accurately represents social learning.

Results: For a sample of individuals chosen randomly from an ideal population, the expected time to most recent common ancestry for a cultural trait is calculated.

Conclusions: This model is the first step toward a comprehensive multi-ancestor coalescent theory. Such a theory will allow for statistical inference about historical demography to be made from data on cultural diversity, providing additional insight into demographic events in the human past.

#6

The Role of Foreigner-Directed Speech in Language Evolution

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Objectives

The current study presents a novel experiment which aims to bridge the gap between theoretical approaches and observed trends in language typology and evolution. Lupyan & Dale (2010) found that the bigger the population using a language, the more that language will encode functional items using lexical strategies. These correlations are hypothesised to be the result of larger language populations having more adult second language learners with different learning biases from first language learners, which may include preferring lexical over morphological strategies³. Experimental work on the differences between adult and child learning has shown contradictory results¹⁻². The current study seeks to demonstrate that foreigner-directed speech should be considered when explaining the typological correlations discussed above. The experiment investigated whether interacting with a perceived foreigner would influence an interlocutor to adopt lexical over morphological strategies.

Methods

Participants were trained on an artificial language. The language offered two ways of describing the scenes used in the experiment, either using a lexical and a morphological strategy. Participants were in one of two conditions, either the esoteric or exoteric condition, where they perceived their interlocutor as either an insider or outsider respectively. The frequency of lexical or morphological strategies used in a communication task was recorded.

Results

The results show that lexical strategies are adopted more by participants in the exoteric condition, but only if the first speaker in an interaction initially uses a lexical strategy.

Conclusions

Foreigner directed speech should be considered as a factor in the cultural evolution of language when seeking to explain trends in language typology.

References

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3. Lupan, G. & Dale, R (2010). Language structure is partly determined by social structure. *PLoS ONE* 5(1): e8559

#7

Self Esteem as an Evaluative Cue Detection Mechanism

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Objectives: Self-esteem could be an adapted psychological mechanism that is sensitive to cues informing individuals of their value and position within social groups: a ‘sociometer’ (Leary and Downs 1995; Leary *et al.* 1995). This study tested the hypothesis that high and low self esteem individuals differ in their attention to cues of being evaluated. This should be the case if self-esteem is an adaptation facilitating social interactions.

Methods: Self-esteem was measured using an Implicit Association Task and explicitly with a self report scale. A dot probe task measured attention toward cues of being watched or toward neutral stimuli.

Results: Results indicate that those with lower implicit self-esteem are vigilant toward cues of being watched, whereas those with high implicit self-esteem show a bias away from these stimuli. Further, after a rejection manipulation, rejected participants demonstrated a bias away from cues of being watched and the opposite was the case for accepted participants regardless of self esteem level.

Conclusions: Results indicate that those with low implicit self-esteem may be more vigilant toward cues of potential evaluation as they may need to avoid further losses in their social standing. However, after a rejection experience, as negative cues have already been detected, it may be better to avoid evaluative situations in order to reduce further rejection risk regardless of trait self-esteem level. This research provides support for the ‘sociometer’ theory of self-esteem.

References:

Leary, M. R., Tambor, E. S., Terdal, S. K., Downs, D. L. (1995) Self-esteem as an interpersonal monitor: The sociometer hypothesis. *Journal of Personality and Social Psychology*. 68(3). Pp.518-530

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#8

Self-Domestication and Language Evolution

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Objectives

Many cultural approaches to language evolution view linguistic structure as the result of language adapting to the circumstances of its transmission. This can be contrasted with the idea that linguistic structure is encoded in the genome. However, as has often been acknowledged, for such cultural accounts to work they have to *assume* the presence of certain cognitive capacities. In particular, the **traditional transmission** of a species' communication system, and the capacity to **infer communicative intentions**. These capacities themselves require explanation.

Methods

A key starting point for that explanation is to look for evolutionary analogies, where similar traits may have appeared in other species, as a guide to how and why they may have emerged in humans.

Results

Work by Kazuo Okanoya with the Bengalese finch shows traditional transmission coming to play a greater role in a species' communication system; while work by Dmitry Belyaev with silver foxes shows the beginnings of the capacity to infer communicative intentions. The one feature that unites both these bodies of work is that the shifts in question occurred following *domestication*.

However, many of the evolutionary effects of domestication have nothing to do with the agency of an external domesticator, but instead derive from the unusual conditions of the domesticated environment – predator free, food supply, shelter, etc. – conditions which apply regardless of whether that environment was created *by* or *for* the organism in question.

Conclusions

The evolutionary parallels between humans and domesticated species have recently been receiving increasing attention, particularly in relation to morphology. This has led some to describe humans as being *self-domesticated*. Building on this work, and the comparative evidence cited above, I shall argue that key capacities underlying language transmission and structure may well be related to our ancestors' self-domestication.

#9

Minimally counterintuitive religious beliefs and prehistoric art

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Objectives

Late Pleistocene art frequently exhibits representations of therianthropes (half-human, half-animal beings), often interpreted as religious imagery. A better understanding of therianthrope representations across cultures could provide insight into prehistoric religious beliefs.

Methods

We will apply theoretical models developed in the cognitive science of religion (CSR) to anthropological case studies from Australia, South Africa and North America, and use this framework to elucidate the function of therianthrope representations in prehistoric European art.

Results

According to standard theories in CSR, religious beliefs are typically minimally counterintuitive: they violate some of our intuitive ontological assumptions but adhere to most others (e.g., ghosts violate intuitive physics by walking through walls, but they have a normal belief-desire psychology). This provides such beliefs with a memory advantage: they are easy to remember and to transmit. However, in order to explain why religions across cultures make extensive use of visual art, cognitive archaeologists argue that minimally counterintuitive concepts need to be externally represented: material culture is a constitutive element of religious cognition. If these concepts are so easy to remember, why the need for external representations? Therianthropes are minimally counterintuitive, since humans make an intuitive ontological distinction between animals and humans. We argue that religious imagery can help to recall counterintuitive ideas with far greater accuracy than is possible through oral transmission alone, by making the assumed, tacit elements visible (e.g., one can orally transmit the idea that a mermaid is half-woman half-fish, but one requires a visual representation to exactly see what she would look like). The fact that prehistoric artists wanted to transmit accurate ideas by depicting therianthropes indicates a doctrinal element in prehistoric religions that has hitherto been neglected in CSR.

Conclusions

Even minimally counterintuitive religious beliefs, despite their memory advantage, require external representation in order to be accurately transmitted.

#10

The emergence of social communication in structured populations

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Objectives

Nonhuman primates monitor their social network through direct contact and observation, maintaining a model of their groups' dominance hierarchy (Bergman et al., 2003). In dense populations this social monitoring may be the primary function of vigilance behaviour and should increase with group size and density (Hirsch, 2002). Humans came under selective pressure not only to extract this information from the calls of others, but to communicate this information (Seyfarth et al., 2005). Language may have evolved for this task under selective pressures resulting in increasing group size (Dunbar, 1996). The aim of this study is to test whether increasing group size in structured populations can account for the evolution of such frequent social communication.

Methods

Previous evolutionary simulations have shown that larger populations can increase the probability of choosing to exchange social information (*gossip*) over engaging in physical contact (*grooming*) in an unstructured population (Slingerland et al., 2009). I propose a computational model of communication in a structured, dynamic population. The population consists of a number of agents, each with a representation of their social network and a trait that determines their probability of communicating this information to other agents. Agents monitor their social network through: (a) observing the interactions of other agents; and (b) communicating the interactions to other agents.

Results

Consistent with previous results, the model demonstrates that increasing group size in a structured, dynamic population can lead to an increase in communication probability.

Conclusions

Population size can drive the frequency of communication, where contact or observation is not sufficient to maintain knowledge of the social network.

#11

Embodiment: understanding and speaking by doing

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Objectives

Embodiment theory suggests a direct link between gesturing and gesticulation and language production. In growth-point theory the constant interaction between gesturing and language generates thought. Gestures are thus not only signs but a direct expression of thought and cognition. Consequently, the communicative function of gesturing is not limited to being a signal or message carrier about the outside world, but gestures also convey information about cognitive processes in the sender. In our view this is paramount to the evolution of language. In this study we extend this approach to general body motion and theorize, that not only gesture is coupled to language - but language involves the whole body. This results in the theory that language per se is a motion process.

Methods

We analyzed n=50 interactions in a video chat situation where the interactants either retold the plot of a short comic movie, or described a building. We then analyzed the videotaped interactions with computer vision methods to detect motion primitives.

Results

The analysis of motion primitives suggests that the receiver understands the senders story the better the more he/she synchronizes. The results also suggest that the listener generates similar motion primitives as the sender, not only with gesturing alone, but also with the motions of his body.

Conclusions

This means that embodiment concerns the whole body and is not restricted to gesturing, albeit gestures appear to be the most prominent behavior in this respect. This study has far reaching implications for the evolution of language theories which focus on gestures as precursors for language. In our view language is embodied in the very sense of the word.

#12

Reconstructing linguistic phylogenies – a tautology?

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Objectives

The number of studies extending computational phylogenetic tools to the domain of language is on the rise, and some of this work has given us new quantitative insights into hitherto unanswered questions regarding the nature of language change. In this talk we want to investigate the methodological foundations of using computational methods to reconstruct linguistic phylogenies based on phonological, lexical and structural characters.

Methods

Based on a literature survey of the last 10 years we identified the types of characters typically used for computational phylogenetic reconstructions. After characterising the ontological status of these characters within their original domains (phonology, historical linguistics & typology), we investigated how these traits are interpreted and used within computational frameworks.

Results

Our results indicate that most of the work on computationally reconstructing linguistic phylogenies is tautological in nature. Rather than reconstructing a history out of synchronic features, we show that the features themselves are already the product of a concrete proposed evolutionary history which is established before the computational models are even put to use.

Conclusions

We conclude that the field is plagued by a confusion between what Haspelmath calls “descriptive categories” and “comparative concepts”. This calls into question the methodological foundations and consequently the interpretation of current computational phylogenetic reconstructions based on linguistic traits. We also discuss how our findings relate to approaches based on purely typological characters as well as Levinshtein distance (the minimum edit distance between words).

#13

An experimental test of cultural drift in Acheulean handaxes

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Objectives: Acheulean handaxes were in continuous use for over a million years and thus were one of the main technologies of the Homo lineage. However, the cultural transmission processes that shaped their evolution are not well understood. Here we provide the first empirical test of a null model of cultural drift proposed by Eerkens & Lipo (2005) that artifact size can change randomly over successive generations simply through perceptual error. Specifically, when two artifacts are so similar that differences between them cannot be perceived, then this imperceptible difference can cause different lineages to diversify in a drift-like process.

Methods: In a transmission chain experiment, 10 chains of 10 participants were presented with two images of Acheulean handaxes on an iPad and asked to resize one to match the size of the other using a two-finger pinching gesture. The resulting image then served as the target image for the next generation.

Results: Transmission errors were normally distributed with a standard deviation of approximately 2.8%. Unexpectedly, the mean size of the images increased over generations; using a Monte Carlo simulation of the null model with the empirical standard deviation we found this increase to be significant ($p=0.01$). We suggest that the upward trend was caused by the design of the experiment, which emulated real stone-tool knapping by having the initial image to be resized beginning at a larger size than the target image.

Conclusions: We have empirically validated the null model of cultural drift by perceptual error, and our empirically derived error value distribution allows researchers to test cultural selection hypotheses in the same way as researchers in biological evolution test selective hypotheses against genetic drift. Subsequent experiments will identify the effect, if any, of the size-reductive process involved in knapping on the cultural evolution of Acheulean tools.

#14

Evidence for selection in the evolution of a human communication system

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Objectives

Many recent studies have highlighted the role of cultural evolution on the structure of human communication systems. Possible candidate mechanisms to explain how these systems change include neutral drift, a bias for interlocutor coordination and content bias. Our objective is to investigate the impact of these mechanisms using empirical data in combination with computer simulations.

Methods

The results of Fay et al.'s (2010, *Cognitive Science*) laboratory studies provide excellent data for this purpose. They found that, when a community of participants play graphical communication games, cultural conventions often spread throughout the community. We used their observed patterns of spread to parameterize an evolutionary model of cultural evolution. We constructed a computer model that mirrored the dynamics and structure of Fay et al.'s (2010) experiments and, with this model, we run simulations of neutral drift, a pressure to locally coordinate with your partner, usage-based exemplar dynamics and content bias. We used maximum likelihood estimation methods to assess the fit of the data generated by the computer simulations to the empirical data.

Results

Neither drift, nor interlocutor coordination bias, nor exemplar dynamics were able to explain the spread of variants in all of Fay et al.'s data. Content bias was able to capture all their empirical observations.

Conclusions

Our results strongly speak for the inclusion of several mechanisms in any realistic model of the cultural evolution or human communication systems. Content bias, in particular, plays a crucial role.

#15

The Human Superorganism Approach to Understanding the Moral Domain

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Objectives: Morality probably evolved in humans to suppress cheating in ultra-social groups (i.e., large groups of cooperating but unrelated individuals). Here, we assume that a major evolutionary transition (sensu Maynard Smith and Szathmary) is underway to create human superorganismal groups. We therefore aim to test the claim that the moral domain can best be understood as a set of concerns that maintain functionality in a human superorganism through control mechanisms such as ostracism, gossip and overt punishment of anti-social behaviours.

Methods: The BBC has recently begun hosting a website-based questionnaire (at www.bbc.co.uk/labuk/experiments/morality) designed to test a variety of hypotheses derived from this approach. The website includes 33 scenarios of everyday situations and asks respondents to express their moral *judgment* about the act in question (i.e., degree of wrongness), moral *feelings* toward the perpetrator (in terms of disgust and anger aroused), and willingness to engage in moral *actions* of avoidance and punishment.

Results: Over 65,000 people from around the world have completed the questionnaire; however, access to the data will only be possible in early December. Results from a pilot (N=450) suggest that all of the Human Superorganism domains are moralized, including those not previously considered by other theories. Further, previously unconsidered violations are judged as severely as those recognized by other approaches, and violations involving information (e.g., reputation) are judged as severely as 'concrete' ones (e.g., rape, theft).

Conclusions: These results suggest the superorganism approach is a better representation of the true extent of moral concerns than alternatives such as Moral Foundations Theory (Haidt and colleagues). Results from the larger sample will be analysed by the time of the conference.

#16

An evolutionary approach to bilingualism

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Objectives

This talk discusses how a consideration of bilingualism can change the way the evolution of culture is approached. A computational model demonstrates that the emergence of bilingualism can be studied in a model that does not explicitly encode discrete languages.

Recent approaches to cultural evolution have considered the number of languages early humans would have spoken. Top-down approaches calculate rationally optimal expectations about the number of languages a learner should expect in their input. However, languages in these models are typically represented as discrete, monolithic entities and social structures are usually fixed. First, using real examples, I argue that representing languages as discrete, fixed concepts in a model of cultural evolution is invalid. A ‘language’ is a range of linguistic variation circumscribed by social structures, history, politics and use. Therefore, the boundaries between ‘languages’ in a model should be fuzzy, dynamic and context-dependent.

Methods

I present a bottom-up model of cultural evolution where agents learn to condition low-level linguistic variation on semantic variables using a domain-general learning mechanism (stepwise regression). This model allows greater social structure manipulation than top-down models. Bilingualism is assessed by comparing two measures: *comprehensive intelligibility* (similarity of speakers’ signals, given the same semantic input) and *functional intelligibility* (similarity of speakers’ signals when designed for their receiver).

Results

The linguistic signal adapts over time to the salient conditioning variables. If the social structure is a salient conditioning variable, then bilingualism emerges.

Conclusions

There is no single ‘rational’ expectation about bilingualism in this model – bilingualism emerges as a response to conditioning low-level linguistic variation on social variables. Therefore, asking whether early human communities were bilingual does not make sense without also considering their social behaviour.

#17

The Social Transmission of Flint Knapping Technology

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Objectives

We present an experiment investigating the role of different social transmission mechanisms (e.g. observation, language) in the social transmission of Oldowan flint knapping technology.

Methods

We carried out transmission chains, with subjects learning to knap flakes, being tested and then demonstrating to the next subject. Chains were carried out under 5 learning conditions – two observation conditions; flakes and actions, and three teaching conditions; basic non-verbal, complex non-verbal and verbal. For each condition we carried out 2 chains of 10 subjects and 4 chains of 5. Subjects were assessed on their ability to produce and identify viable flakes and with a questionnaire to assess their understanding.

Results

Gestural communication allowed subjects to knap a greater proportion of their core relative to no communication, however verbal teaching lead to the production of a greater number of flakes and more efficient use of the core. Flakes produced in all conditions were of equal quality and size. Verbal teaching enhanced the transmission of the understanding of particular aspects of knapping mechanics, such as the platform angle.

Conclusions

Our findings suggest that the stable transmission of efficient stone knapping technology required language. Linguistically encoded knowledge did not improve flake quality, which was likely limited by lack of practice, but did allow individuals to produce a greater number of flakes from a single core and hence use cores efficiently. This effective use of available material is an essential part of stone knapping behaviour and is evidenced even in early archaeological sites.

#18

Mapping out the cultural evolutionary dynamics of probability matching behavior

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Objectives

Probability matching is a pervasive behavior found from language learning¹, to decision making², to basic perception³. Probability matching behavior (PMB) occurs when learners produce responses in the same frequency as their observations (with some error). During cultural transmission, learners' responses become the input for the next generation to learn from, where variance in error defines the system's evolutionary dynamics. The present research describes this variance, derives the resulting evolutionary dynamics for PMB, and compares them with models of drift and selection. Finally, the evolutionary dynamics of PMB are considered for language evolution.

Methods

Participant performance on a basic PMB task of random marble drawing is used to construct a transition matrix to predict the probability, per generation, of a participant guessing marbles of all one color (equivalent to regularization or allelic fixation). An iterated version of the task is used to validate predictions.

Results

PMB works similarly to drift, but is better modeled by stabilizing selection. This means our cognitive architecture creates selective pressures by constraining variation, and highlights an important aspect of cultural evolution where selection can precede the generation of variation. Results from a current experiment determine whether directional selection is present in basic PMB, as in a cognitive bias toward regularization, and have strong implications for the domain-generalty of presumed linguistic biases, as revealed in iterated language learning⁴.

Conclusions

Many cultural evolutionary processes are well-explained by drift⁵, but PMB models may be a better fit. Since marble drawing is not a natural culturally transmitted data set, the next step is to apply this methodology to PMB in statistical language learning to help explain the dynamics of culturally transmitted language learning experiments.

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#19

Ecological testing of two social learning strategies: Majority vs. Best Member

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Objectives In social learning, there are two representative strategies from whom to learn—majority or the best member. Through a series of computer simulations and laboratory experiments, Kameda and his colleagues showed the performance of majority is higher than that of the best member under artificially created environments (Hastie & Kameda, 2005; Kameda, Tsukasaki, Hastie & Berg, 2011). However, the performance of majority depends on various parameters (Takezawa, 2011), therefore the researchers may have unintentionally created an environment that favours majority over the best member. In this study, we examined the performance of two social learning strategies using tasks sampled from real world in order to make fair comparisons of the two strategies.

Methods To avoid arbitrarily setting parameters, we chose 5 classes of objects from real world (i.e., atoms, pop songs, actors, films, protagonist of TV dramas) and prepared 100 objects for each class. We then produced 40 pair comparison problems for each class by randomly sampling 2 objects. 5 different questionnaires, each containing 40 problems, were produced and 250 university students answered one of the questionnaires.

Results We made nominal group analyses and compared the performance of the two strategies with Monte-Carlo simulations. In all 5 classes, the best member outperformed majority. Another simulation further revealed two reasons for the superiority of the best member: one is high correlation among individual judgments; the other is large variance in individual performances.

Conclusions Our study found, in real world, hardly could majority outperform the best member, which suggests that majority strategy may be preferentially used only when the best member is not identifiable.

#20

Transmission fidelity is the key to the build-up of complex culture.

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Objectives

Human culture appears to be unique with respect to cumulative culture, whereby cultural knowledge and technology increase in diversity and complexity over time. It has been suggested that this is due to the high fidelity methods employed by humans to transmit information and other cultural traits between individuals, such as through our use of imitation, language and teaching. Our objective was to test if increasing the fidelity of transmission of cultural traits leads to cumulative culture through ratcheting.

Methods

We used simulation models to test whether increasing trait *fidelity*, and hence longevity, within a cultural group leads cumulative culture. We also explored the relative importance of *novel invention* (generation of new traits), *modification* (refinement of existing traits), and *combination* (bringing together two existing traits to generate a new trait) in the build-up of cumulative culture.

Results

Our results show that small increases in transmission fidelity, leading to greater trait longevity, can result in a massive build up of complex cultural traits. In comparison, modification and combination have a lesser influence on the ratcheting process, and novel invention appears unimportant in the development of cumulative culture.

Conclusions

Our findings support the idea that high-fidelity transmission is the key driver of human cumulative culture, and that progress in cumulative culture depends more on trait combination than novel invention or trait modification.

#21

The Painting Ape. A Cognitive Reappraisal of the Ape Art Debate

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Objectives

The ability to create and appreciate art is thought to be one of the most striking features of being human. Some researchers have questioned whether this capacity is limited to man, and have attempted to find similar behaviour among other animals, such as birds and elephants. For phylogenetic reasons, non-human primates warrant special attention. In this paper, I aim to reinvestigate claims that these species are capable of creating art.

Methods

In order to do so, I gathered the main empirical studies debating ape art, performed during the previous century (Kellogg & Kellogg 1933, Kohts 1935, Schiller 1951, Morris 1962). The findings from these studies are compared to present-day research on the cognitive foundations of art production in humans (e.g. De Smedt & De Cruz 2011), in order to assess whether the registered ape behaviour corresponds to what are considered cognitive prerequisites for the human ability to create art.

Results

Based on this analysis, I conclude that the label of art is not to be attributed to non-human primates, because no convincing correlations arise between original empirical work and current cognitive knowledge on human artistic cognition. Non-human primate paintings and drawings probably spring from basic visual perception mechanisms shared with humans.

Conclusions

Painting and drawing in great apes does not qualify as art in a human sense, and we should be aware of the tendency to anthropomorphize. In addition, this implies reconsidering the relevance of the ape art debate for researching the origins of art in human evolution.

#22

Reading Minds: Narrative Language and Multiple-Order Intentionality

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Objectives

The analysis of cognitive handling of multiple-order intentionality (MOI) seems to imply a paradox. On the one hand, analytic formulations of MOI very quickly become opaque. This can be well illustrated by (paraphrasing situations from) certain novels and plays: in e.g. Shakespeare's *Othello* the audience has to *understand* that Iago *intends* that Cassio *believes* that he *intends* that Desdemona *intends* that Othello *considers* Cassio's rehabilitation...¹ On the other hand, there is the empirical fact that a play such as *Othello* has been understood and appreciated for ages, indicating that a normally gifted reader/watcher can follow it without undue cognitive strain. This suggests that some aspects of the exposition of information in *Othello* and comparable texts must alleviate the cognitive burden of processing MOI. My objectives are (1) to describe these aspects, and to explain how they relate to (2) the (cultural) evolution of linguistic devices that facilitate both communication and cognition², and to (3) the framework of "dual inheritance"³.

Methods

I 'conciliate' concepts and analytical tools developed in cognitive linguistics/narratology *and* in evolutionary psychology/-anthropology, and apply them to a corpus of widely understood narratives that involve MOI.

Results

Seven aspects of *narrative exposition* are structurally involved in the presentation of MOI: redundancy; characterisation; viewpoint alternation; framing; episodicity; temporal extension; multidimensionality.

Conclusions

An analysis of how MOI is presented in narratives reveals something about the role of culturally evolved devices in the human ability to keep track of complex networks of embedded mind states.

¹ Cf. R.I.M. Dunbar. (2008). 'Mind the Gap or Why Humans Aren't Just Great Apes', *Proceedings of the British Academy* 154: 403-23.

² Cf. M. Tomasello. (2008). *Origins of Human Communication*. Cambridge MA: MIT Press, ch. 6.

³ R. Boyd & P.J. Richerson. (1985). *Culture and the Evolutionary Process*. Chicago: U of Chicago P.

#23

Female facial appearance and health.

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Objective/ Methods

The current study addressed whether rated femininity, attractiveness and health in female faces are associated with numerous indices of self-reported health history (number of colds/stomach bugs/frequency of antibiotic use) in a sample of 105 females. It was predicted that all three rating variables would correlate negatively with bouts of illness (with the exception of rates of stomach infections), on the assumption that aspects of facial appearance signal mate quality.

Results

The results showed partial support for this prediction, in that there was a general trend for both facial femininity and attractiveness to correlate negatively with the reported number of colds in the preceding twelve months and with the frequency of antibiotic use in the last three years and the last twelve months. Rated facial femininity (as documented in September) was also associated with days of flu experienced in the period spanning the November-December months. However rated health did not correlate with any of the health indices (albeit one marginal result with antibiotic use in the last twelve months).

Conclusion

The results lend support to previous findings linking facial femininity to health and suggest that facial femininity may be linked to some aspects of disease resistance but not others.

#24

Signals of personality and health from the face remain even when controlling for head posture: Further evidence for a signal system of personality from the face

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Objectives

Many socially-relevant traits are accurately identified solely from photographs of the neutral face. This correlation between behaviour and facial appearance has been used to argue for an evolved signal system facilitating human social interaction (e.g., Kramer, King, & Ward, 2011). However, previous studies are all potentially confounded by posture. Slight but systematic differences in head posture might plausibly signal traits (e.g., chin elevation might cue agreeableness). Personality signals might then be unrelated to facial features, but to controllable aspects of posture. To control head posture, we created composite images from 3D facial scans. We also assessed separate contributions of facial shape, texture, and viewing angle to personality identification.

Methods

We created 3D composites of women scoring high and low on the Big Five personality traits and health, using passive stereophotogrammetry. Composites were rendered at a controlled orientation, facing straight on, and at viewing angles of 45° to the left and right. Shape and texture composites were also rendered separately, by manipulating an average female face

Results

Agreeableness, Neuroticism and Health were accurately identified across conditions. However, although Extraversion has been previously identified in 2D composites, it could not be identified when we controlled for posture. We also found that personality information, when present, was primarily detected from the right side of the face.

Discussion

Even a “neutral” photograph is a social interaction, and nonverbal signals including head posture are apparently used during this interaction to signal personality traits, including Extraversion. In addition to these kinds of controllable cues (Mazur, 2005), we demonstrate personality is signalled from a variety of facial features.

#25

The Dynamic Nature of Emotional Expressions

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Objectives

The main body of research on facial expressions is based on static images. In social interactions, facial expressions are characterised by an onset, apex and offset, thus making the dynamics an integral part of expressive behaviour. It lies at hand to assume that evolutionary selection pressures favoured the integration of the dynamics in the interpretation of emotional expressions. Previous studies indicate that facial dynamics change the perceived meaning of smiles. The aim of the present study was to test whether the perception of basic emotions in general depends on facial dynamics.

Methods

We analysed basic emotions as well as contempt expressed by one male and one female virtual agent with all AUs implemented as morph targets. A major advantage using this model is that facial dynamics can be varied in onset as well as apex length. We created all possible combinations of an onset of 5 or 25 frames and an apex of 10 or 70 frames and an offset of 17 frames. 56 female and 56 male stimuli were rated by 50 women each on emotional valence and honesty.

Results

We found that the dynamics significantly affect the attribution of emotions. Happy expressions with a long onset were rated as happier than ones with a short onset. Angry expressions with a slower onset were perceived as more negative.

Conclusions

The findings of this study suggest that the dynamics affect the meaning of facial expressions, with the effect being strongest in smiles. While static images might give some clue about the emotion expressed, the understanding of expressions can be substantially enhanced when including timing.

#26

***“That which doesn’t break me, only makes me stronger”*: Pre-natal testosterone, psychopathy and survival.**

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Objectives:

Research has consistently evidenced the deleterious consequences of poor parental practices. Typically, children who experience sub-optimal parenting manifest a range of adversarial and anti-social behaviours such as aggression and conduct problems (Jaffee et al., 2005). Belsky, Steinberg & Draper (1991) suggested that instead of being maladaptive, harsh parenting could have an adaptive function in preparing the offspring for a hostile environment. Sub-optimal parenting can start during pregnancy as the development of the foetus is affected by the mother’s psychological and physiological wellbeing. Some elements of wellbeing are within the mother’s control whilst others are not. The second-to-fourth digit ratio (2D:4D) digit ratio as a retrospective marker of prenatal androgens that allows us to investigate the effects of these hormones on early developmental. Evidence from 2D:4D suggests that smoking increases intra-uterine testosterone (Rizwan, et al. 2007). Additionally, masculinised ratios (low 2D:4D) in adults have been associated with a range of male-typical behaviours such as aggression (Bailey & Hurd, 2005), risk-taking (Stenstrom et al. 2010) and dominance (Millet, 2011). This research investigates whether indicators of prenatal testosterone and poor parenting contribute to psychopathic behaviours and traits in adults.

Results:

Males had lower 2D:4D than females in their right hands. Across the whole sample, low 2D:4D in the right hand, indicating higher prenatal androgens, was associated with lower maternal care and also predicted higher levels of psychopathy.

Conclusions:

Psychopathic affect and behaviour may arise via combination of maternal effects during prenatal development and parenting style. These factors may contribute to competitive and dominant behaviour over con-specifics and thus promote survival.

#27

I'm better looking than that! Own perceived attractiveness affects motivation to view faces

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Objectives

Heterosexual men and women show motivation to view beautiful faces. Men work extremely hard to view opposite-sex beauty, but not same-sex beauty; whereas women exert moderate effort to view both opposite- and same-sex beauty. The present study investigates the impact of self-perceived attractiveness on motivation to view others, and particularly motivation to view same-sex faces – does this represent a less stringent sexual preference in women? Or are women viewing other women to “measure up” the competition?

Methods

Participants were given a ‘pay-per-view’ key-press task whereby they control the viewing time of each image. Sixty natural male and female faces, varying in attractiveness, were used. Exerting work by pressing an alternating set of keys increased or decreased the presentation time of each face. This key-pressing is a reflection of the motivational salience of the stimulus. Participants were also asked to rate the attractiveness of each face in relation to their own perceived attractiveness.

Results

Results indicate that individuals who rate themselves as average or below average attractiveness do not find beauty as motivating as individuals who rate themselves above average. Additionally, we found that the most effort was exerted to view faces that were rated as equally or more attractive than participants considered themselves to be.

Conclusions

These findings suggest that individuals with high self-perceived attractiveness are more motivated by facial attractiveness. Low-attractive individuals find unattractive faces more aversive and do not derive the same reward from beauty as individuals with high self-perceived attractiveness. As a result high-attractive individuals may be more motivated to compete for mates, perhaps contributing to higher reproductive success.

#28

Implicit health status evaluations shift preferences in female body shape for males and females

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Objectives: Implicit evaluations of resource (food/finance) availability influences male but not female preferences for female body shapes. We explored what happens to male and female attractiveness, health and normality preferences for female body shapes following an informal reference to either local pathogen load, local traffic conditions, or they were given no information at all.

Methods First we asked participants (3 independent groups; n=30) to indicate their preferences for female body shape, using a booklet containing a range of body shapes, that varied from low to high BMI. Next, using scripted conversations, we asked one group (ILLNESS) if they had been ill lately, and another (TRAFFIC) if they had difficulty with the traffic. A third group received no conversation (CONTROL). Participants then repeated the preference task.

Results The findings provided clear evidence of a shift in preference towards heavier female bodies for both men and women in the ILLNESS group for attractiveness and health. This shift was also present for males (not females) in the ILLNESS group for normality. There were no other changes elsewhere.

Conclusions We draw 3 conclusions: (a) that male and female preferences for female body shape are not fixed but vary with local environmental, (b) there is a generalized evaluative mechanism for assessing local pathogen-load, and (c) where pathogen load is perceived to be high there is a tendency for both males and females to shift their preference towards a heavier/more mature female body shape.

#29

Perceived trustworthiness depends on the partners' gaze direction

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Objectives

Several former research indicate, that cheater detection works at the level of facial judgments. Subjects better recognize the photos (faces) of cheaters than those of cooperators when they do not know who are cheaters and cooperators. Evaluation of partners' trustworthiness is automatic and adaptive. To avoid exploitation, people have to make rapid decisions about the intentions (cooperation or cheating) of the partner. Eyes are the most informative part of the face. Gaze direction of the target presumably affects judgments about perceived trustworthiness.

Methods

Participants rated the trustworthiness of faces on a 6 point likert scale. We used average faces (one male and one female) looking in 5 different directions (direct, left, right, up and down). The target faces appeared among several individual faces, which were also rated.

Results

Average faces with direct gaze were rated as most trustworthy. Down looking faces were judged as less trustworthy. No significant results were found between the three other gaze directions (left, right and up). The ratings were independent from gender of target and of subjects.

Conclusions

Our results indicate, that trustworthiness decisions depend on several facial features, like gaze direction. Untrustworthy faces might look different from trustworthy faces, but this discrimination is not based only on universal, constant facial cues.

#30

Sex differences in impulsivity: A meta-analysis

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Objectives: Men's greater engagement in impulsive and risky behaviour has been argued to be a product of sexual selection. Proposed psychological mechanisms underlying this sex difference include impulsivity and sensation seeking. We used meta-analysis to examine patterns of sex differences in impulsivity and sensation seeking as assessed by psychometric and behavioural measures.

Methods: Studies were included if they had at least 10 male and 10 female participants over the age of 10 (from a population not selected for risky behaviour or pathology), and contained a measure of impulsivity or sensation seeking. The 277 studies in the analysis yielded 741 effect size estimates, which were grouped into six domains: General measures of impulsivity, specific forms of impulsivity, sensation seeking and risk taking, reward sensitivity, punishment sensitivity, and behavioural measures.

Results: Sex differences in general measures of impulsivity were weak, although men scored slightly higher on average ($d = 0.08$). Men consistently scored higher than women on measures of sensation seeking and risk taking ($d = 0.41$). Women were consistently more punishment sensitive than men ($d = -0.33$), but men were not consistently more reward sensitive than women ($d = 0.01$). Specific forms of impulsivity and behavioural measures showed inconsistent effects.

Conclusions: Results indicate sex differences in emotional and motivational processes, rather than in executive forms of control. This is consistent with evolutionary accounts suggesting that selection pressures differ between the sexes with regard to the former but not the latter. The findings also suggest that greater punishment sensitivity in women, rather than greater reward sensitivity in men, might underlie sex differences in risk-taking behaviour.

#31

Looking like a leader: Face shape predicts height and perception of leadership

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Objective:

Physical height is associated with political success. For example, the majority of U.S. presidential elections have been won by the taller candidate. Judgments of leadership from face images of unfamiliar political candidates predict actual election outcomes, yet facial cues to leadership perception remain unclear. We assessed if cues to height exist in the face, and if so, whether they are associated with impression of leadership ability.

Methods:

We used natural faces to test whether real height predicted perception of height and leadership ability. We then allowed participants to manipulate faces along shape continua simulating changes in apparent height to maximise perceived leadership ability. Morphometric analysis was run to determine if height and masculinity are distinct facial parameters.

Results:

We found that shape cues to height were apparent in both men and women. Furthermore, faces perceived as belonging to taller people were perceived as belonging to better leaders. Face cues to height were found to be morphologically distinct from cues to masculinity.

Conclusion

Height plays a significant role in leadership perception, and leadership ability perceived from face images predict actual election outcomes. The current study presents the first experimental evidence of a facial cue linking perceived height and leadership ability. Facial cues to height may therefore be influential in leader selection.

#32

Mating strategies predict women's memories for encounters with men.

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Objectives:

Masculine characteristics in men may signal mate-choice-relevant qualities to women. Although our recent studies have demonstrated that women's episodic memory is sensitive to cues of sex-typicality in men's faces and voices it is not known if these potentially adaptive memory biases co-vary with individual differences in women's mating goals. Consequently, we investigated the extent to which individual differences in women's mating strategies predict the strength and direction of memory biases for encounters with masculine or feminine men.

Methods

Women completed a standard episodic memory task that required them to recall specific details associated with masculinised and feminised versions of men's and women's faces that they had previously seen. Our participants then completed the revised version of the Sociosexuality Orientation Inventory (SOI-R), a widely-used measure of individual differences in openness to pursuing short-term mating strategies.

Results

Analyses of performance on the episodic memory task revealed a positive correlation between women's scores on the SOI-R and the extent to which they demonstrated better recollection of details associated with masculinised versus feminised men. While women reporting being *more* open to short-term relationships showed better recall of episodic detail involving *masculine* men, women reporting being *less* open to short-term relationships showed better recall for episodes involving *feminine* men. By contrast with these findings for men's faces, women's scores on the SOI-R did not predict their memory for details associated with masculinised versus feminised women.

Conclusions

Together these findings suggest that biases in women's memory for episodes involving men, but not women, are sensitive to mating-relevant factors, such as men's physical characteristics and women's own sexual strategies. These results therefore imply that women's memory is tuned to information associated with desirable men, and may be functionally adapted for mate choice.

#33

Different forms of disgust

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Objectives

Disgust has probably been selected for avoidance of infections. Spread of infections is more likely, if there are others present. Intuitively, some disgusting actions are prohibited in public but permissible when alone (e.g. spitting in a glass of water before drinking it). Moral transgressions are universal, i.e. killing somebody is not permitted, no matter whether it is done in public or not. This difference between being alone or not seems characteristic of disgust. However, empirical evidence is needed. There are also different forms of disgust (core disgust, contamination disgust, animal reminder disgust, etc.) and the phenomenon might not occur for all forms of disgust.

Methods

Two studies were done a webbased study, whereby it was tested whether disgust transgressions as opposed to moral transgressions could be acceptable when alone. In a follow-up pen and paper based study, whereby participants answered questions about different forms of disgust it was again tested whether it would make any difference whether the actor was alone or not.

Results

Both the webbased study and the pen and paper based study showed that for some disgust transgressions there was a statistically significant difference between being alone or not and these transgressions were theoretically associated with an increase in the risk of contaminating bystanders (e.g. spitting) while for others there was no difference (drinking spoilt milk).

Conclusions

The fact that for some disgust scenarios transgression is acceptable when alone, is consistent with disgust being selected for avoidance of infections and probably via a complex mechanism, given that it does not occur for all forms of disgust.

#34

Big Eyes and Big Bodies Limited Neanderthal Sociocognition

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Objectives

To investigate the implications of differences in brain organisation for the sociocognitive capacities of *Homo sapiens* and *Homo neanderthalensis*. By demonstrating and correcting for visual and 'somatic' cortex size differences, we aim to test whether, as the archaeological record indicates, Neanderthals had significantly smaller groups than contemporary humans.

Methods

We used eye-socket volume to index eyeball volume and, due to close scaling between visual system components, visual cortex volume. We then tested for (1) a relationship between absolute latitude light levels and visual system size in humans and (2) a visual system size difference between Neanderthals and humans associated with latitudinal light-level variation.

We estimated fossil brain volumes from cranial capacity using a primate-derived equation. We standardised these for visual and body mass differences, so that the effect of differential brain organisation is removed. We then used primate equations to re-calculate estimates of group size and Theory of Mind abilities.

Results

Visual system size is strongly positively associated with absolute latitude in recent humans.

Neanderthals have

- significantly larger visual systems,
- significantly smaller groups
- and lower Theory of Mind abilities than contemporary humans.

Conclusions

Previous estimates of Neanderthal sociocognitive abilities via brain size assumed identical brain organisation and therefore yielded comparable group sizes and Theory of Mind abilities to humans. However, correcting for differences in the amount of neural tissue dedicated to vision and somatic maintenance indicates that Neanderthals had significantly smaller groups than contemporary humans, corroborating the archaeological record.

#35

Strategic use of information in human mating

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Objective: One's ability to select potential mating partners according to one's preferences is affected by asymmetric information and a related potential conflict of interest between prospective mates. When an individual is evaluated by a prospective partner he can choose to withhold or misrepresent information about him- or herself in order to appear more attractive. The strategically aware receivers of the information can deal with this problem by responding selectively to the information they receive. In other species this has led to the evolution of so-called strong signals about individual quality as a mate (the symmetry of the peacock's tail etc). These signals cannot be falsified by an individual in search of a mate and are relied upon by the receivers in order to make an informed choice. This paper aims to see how the problems associated with asymmetry of information are dealt in human mating.

Methods: I pursue this aim using a dataset that documents the features and behaviour of 15,000 Japanese clients of an online dating agency. The customers of the agency can withhold information, make an unsupported statement (e.g. my income is 30000 a year) or make a statement and provide supporting documents (e.g. salary slip) about 5 individual characteristics: income, job, address, education level, whether single or not. On several additional characteristics (photo, height, weight) the customers can choose whether to provide information or not, but cannot supply proof for their statements. I measure individual attractiveness by the number of times their profile is viewed and use zero truncated negative binominal regression for the analysis.

Results: Providing information, even if unsupported, on key variables such as income, education, age, height and weight makes it easier for an individual to attract mates. However, supporting self-reported claims with documents does not confer a significant advantage.

Conclusions: While providing some information is better than none, humans have not evolved unambiguous strong signals for such individual attributes as earning power and constructed strong signals do not have a significant effect on mating choices.

#36

What We Can Learn from Moulay Ismael

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Objectives

Textbooks on evolutionary psychology and biology cite the case of Moulay Ismael (1672-1727) who is said to have sired 888 children. When attempting to answer the question whether this is possible, conception likelihood is one of the core variables

The three conception models used in our study differ in respect to the specific quality of the data basis: Wilcox-Weinberg is based on couples intend on reproduction, Barrett-Marshall on couples trying to avoid pregnancy, and Jöchle is based on pregnancies resulting from rape and rare copulations in soldier couples.

Methods

We developed a computer simulation to test whether Moulay could indeed have sired this many offspring, and how different conception models affect the outcome. We implemented the three abovementioned different models of conception in our simulation. In the first model we used a random mating pool, in the second a restricted harem pool.

Results

The results indicate that the different conception models have a significant impact on the potential reproductive success of Moulay. The reproductive effort is lowest for the model based on Jöchle, and highest for the model based on Weinberg-Wilcox.

Conclusions

The results indicate that the different conception models have a significant impact on the potential reproductive success of Moulay. The differences in the distributions of conception likelihood over the menstrual cycle could be explained by the very nature of the samples. As Moulay's concubines most likely had rare copulations, Jöchle provides the most valid estimate. Rare copulatory behavior seems to be associated with a broader distribution of conception over the female cycle, which might be an indicator of induced ovulation under these circumstances.

Studies about conception likelihood should take the life-style of their subjects into account.

#37

Testing phenotype matching and sexual imprinting theories

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Objectives

Sexual imprinting and phenotype matching theories are two rival concepts of evolutionary psychology. The former suggests that during childhood humans internalize the facial appearance of the opposite-sex parent, which serves later as a basis of mate choice. The latter emphasizes the reproductive advantages caused by the similarity of mates. Our aim was to test the predictions of these theories, and investigate how various features, such as attractiveness of potential partners, and parental attachment, influence face preferences.

Methods

Male and female composite faces were constructed with different levels of attractiveness. Shape-only transforms of the composites were created, so as to resemble either subjects, their parents, or an unknown individual. Volunteers were exposed to opposite-sex image pairs, and were instructed to choose the most attractive one. Finally, they were asked to fill out the EMBU retrospective attachment questionnaire.

Results

Both sexes preferred self-resembling faces, provided they were warped into the most attractive composite. Subjects with high scores on the „rejection” sub-scale preferred faces resembling their opposite-sex parent less than those with low scores. The „emotional warmth” sub-scale predicted men's choice in a similar manner.

Conclusions

Preference for self-resemblance interacts with attractiveness in such a way that when facial cues reflect high genetic quality, the more subtle markers of genetic similarity become also important. Furthermore, those who had good relations to their opposite-sex parents during infancy are more willing to choose partners resembling them, which is in agreement with the predictions of sexual imprinting theory.

#38

What's in a face? And what isn't?

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Objectives In a recent study we found that women were able to accurately detect, and express preferences for, athletic ability from the male face. In the same study we found that women could not detect verbal fluency from the face, although they preferred a composite face constructed from the faces of males with low fluency over one constructed from faces of males with high fluency. In the current study, we investigated the facial attributes that contribute to judgements of athleticism and fluency.

Methods From 23 Caucasian men (age: 20.43 (4.56)) we obtained information about height and weight and tested athletic ability (running time) and verbal ability (verbal fluency tests). Athletic and verbal abilities were positively correlated in this sample. We then presented these men's faces, aligned on inter-pupillary distance and masked to obscure hair, to female raters who rated them for attractiveness, verbal fluency, athletic ability, health, masculinity and dominance. Each attribute was rated by a different group of individuals, to avoid halo-effects.

Results PCA revealed two factors, one with high loadings of attractiveness, health, verbal fluency and athletic ability ("attractiveness" factor) and the other with high loadings of dominance and masculinity ("masculinity" factor). Multiple regression analyses showed that the attractiveness factor was positively associated with height and negatively with weight, whereas the dominance factor was only positively associated with height. Perceived verbal and athletic abilities did not correlate with actual abilities.

Conclusions Results confirm previous findings that masculinity is not typically considered attractive in UK samples, and that height is associated with male threat potential and dominance (Puts et al., 2011). They also are consistent with an attractiveness halo effect in which positive traits, including athletic ability and verbal fluency, are attributed to attractive individuals rather than directly recognised in the face.

#39

You can't always get what you want: mutual mate choice results in couples where preferences of neither sex are optimally satisfied

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Objectives

Preferences for partner traits may differ between the sexes. Due to differences in preferences and mutual mate choice (i.e. that both sexes choose their partner), one or both individuals from a pair may end up with a less than ideally preferred partner. Previous research has shown that preferences for partner height are different between the sexes, and that actual pairing with respect to height (i.e. heights of couples) is different from indicated preferences. We examined the hypothesis that the discrepancy between preferences and actual pairing is a consequence of mutual mate choice.

Methods

We used data from 174 HurryDate speed-dating events (covering 5,782 individuals). Prior to these events individuals indicated their preferences for a partner (stated preferences). During these events, men and women interacted with each other for three minutes and subsequently indicated if they wanted to have future contact (their choice). Men and women who chose to have future contact with each other, 'matches', were given each other's contact details.

Results

In line with previous research, we show that stated preferences for partner height are different between the sexes, and that these preferences translate into actual choice during speed-dating. Furthermore, we show that due to mutual mate choice the heights of the resulting pairs were different from preferences of both sexes. The heights of the resulting pairs ('matches') were similar to those found in actual couples.

Conclusions

Mutual mate choice results in couples where preferences of neither sex are optimally satisfied.

#40

The effect of starving on human body odour

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Objectives

Previous work on non-human species shows that diet can manifest in secondary sexual characteristics (e. g. carotenoids in body colour or proteins in odour) which in turn affect mate choice and reproductive success. In humans, body odour plays a significant role within mate choice process and is affected by the ingested diet. The main aim of our study was to test how starving affects the hedonic quality of human axillary odour.

Methods

We used balanced within-subject experimental design. Odour samples (cotton pads worn in the axilla for 12 hours) were obtained from 20 healthy female donors using hormonal contraceptives across three conditions: i) during their habitual food regime; ii) after 48 hours of starvation (drinking water was provided) and iii) after 72 hours after restoration of caloric intake. Odour samples were assessed for their pleasantness, attractiveness and intensity by 50 men. Obtained data were processed by repeated measure ANOVA.

Results and Conclusions

Results will be discussed within the sexual selection framework. Body odour quality is linked not only to markers of genetic compatibility or fertility status but also to the dietetic factors. These might provide cues to current fitness status and metabolic efficiency.

#41

Sexual imprinting in peri-pubertal children

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Objectives

Some evidence has been found to suggest that adults may be attracted to features in potential mates which resemble their opposite sex parent. Furthermore, the relationship between parent and child may moderate the formation of this preference. Here we investigate the ontogeny of this phenomenon by considering for the first time whether such preferences can be documented in children on the cusp of puberty, for whom prospective data exists on parent-child relationships via the strange situation attachment category at 18months of age.

Methods

60 9 year olds and their parents were recruited from the Tees Valley Baby Study. Parents were photographed and children were then presented with stimuli in which a computer generated face was manipulated to appear more or less like the parent. Parents and children also completed the Parental Acceptance-Rejection Questionnaire to report on their current relationship.

Results and Conclusions

Although attachment at 18 months did not predict imprinting at 9 years of age, this is likely due to very small sample sizes in the insecure categories. Once other factors were controlled, however, there were significant correlations between current relationship quality and degree of preference for parental features. Results are discussed in the context of developmental trajectories in face preferences.

#42

The effects of a putative human pheromone, androstadienone, on social decision making in women

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Objectives

Androstadienone is a component present in male axillary sweat, and it has been suggested to act as a human pheromone. In earlier studies it has been found to affect a subject's mood and cortisol levels, and to activate the brain regions linked to social cognition, among other effects. However, existing evidence of androstadienone's psychological effects is still quite scarce. The aim of this study was to investigate how androstadienone affects social decision making in women.

Methods

100 young women participated in the experiment, in which the subjects were exposed to either androstadienone or control stimulus, and then took part in ultimatum and dictator games; decision making tasks commonly used to measure co-operation and generosity.

Results

We found that androstadienone increased generosity in the decision making tasks in women in the non-fertile phase of their cycle, who were not using hormonal contraceptives. On the contrary, women in the fertile phase of their cycle, who were not using hormonal contraceptives, behaved less generous in the tasks when exposed to androstadienone. Androstadienone had no effect on how women, who were using hormonal contraceptives, behaved in these decision making games.

Conclusions

The results of the present study further support androstadienone functioning as a human pheromone. More specifically, our study suggests that androstadienone affects, among other things, social decision making in women; however, these effects seem to be dependent on the phase of a woman's menstrual cycle and usage of hormonal contraceptives.

#43

Robust and dominant: The association of digit ratio with young and adult facial shape

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Objectives Prenatal androgen action as estimated by 2D:4D is associated with a more dominant and masculine appearance. In order to test whether this relationship is limited to adults, we extended our research towards children and adolescents.

Methods Our dataset comprised 39 subadult and 48 adult Caucasian men. Lengths of the second and fourth digit were measured with a vernier calliper, facial shapes assessed by Geometric Morphometrics. More than 50 somatometric landmarks were digitised on frontal facial photographs and subjected to shape regressions upon the 2D:4D ratios. The corresponding shape patterns were visualised using thin-plate spline deformation grids, as well as image unwarping and image averaging. Adult faces were rated for perceived dominance and masculinity.

Results We learnt that the aspects of shape covarying with masculinity and dominance in adults were aligned with those covarying with the 2D:4D ratio (as measure of prenatal testosterone). Moreover, highly similar facial correlates of 2D:4D were depicted in boys (14.5% var. explained, $P < 0.05$ after 10,000 permutations) compared to adults.

Conclusions Contradicting existing hypotheses, facial robustness associated with low 2D:4D can be observed years before puberty. It remains to be resolved whether trait attributions and social consequences also replicate the adult pattern. If so, the variation in male digit ratio might reflect maternal preparation for different life history strategies depending on social status and environmental context.

#44

Effects of manipulated voice pitch on listener memory for vocal stimuli

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Objectives: Recent experiments have shown that women are more likely to remember static images when accompanied by a low-pitched male voice, and that both raised and lowered have an effect on listener memory above average, unmanipulated voices. Following these studies, it is possible that voice pitch influences memory, and also biases mis-attribution of memory to voices which exhibit differing traits.

Methods: Male and female voices were recorded speaking a total of 64 words, which were pitch-manipulated +/- 20Hz. Half of these words were presented in a learning phase. Participants were then presented with the complete series of words, and asked whether they remembered the words from the previous phase of the experiment.

Results: Voice pitch did not significantly influence memory of either male or female voices. However, female listeners were significantly more likely to falsely attribute memory to lowered male voices. Male listener memory was unaffected by pitch in stimuli of either sex. We found effects of relationship status, with both single men and women being more likely to remember same-sex voices than partnered men and women.

Conclusions: Increased false-positives for low-pitched male voices among female listeners suggests that women's conservative estimates of memory are somewhat confounded by low voice pitch among males - a trait which is generally considered to be found attractive. These results also suggest that single men and women are more attentive to voices of their own sex, possibly a result of enhanced intrasexual competition.

#45

Male body movements as a possible cue to physical strength and fitness.

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Objectives: Comparative research suggests that in many species, male courtship displays serve to signal condition-dependent traits to females. A key aspect appears to be vigour – the ability to perform energetic acts repeatedly, which requires a high degree of stamina and overall physical fitness. Researchers have therefore begun to focus on movement as a possible signalling mechanism in humans, and thus far relationships have been found between men's dance movements, strength and symmetry, though links between physical fitness and dancing ability have yet to be explored.

Methods: The current study used advanced motion-capture technology to explore the possible relationship between dance, strength and cardiovascular fitness in males, and the biomechanical aspects of movements underlying such potential links. Thirty British men danced to a standard drum rhythm, completed a vascular fitness test, and assessments of upper and lower body strength. Dance clips were converted into controlled stimuli (avatars) and were rated by 27 women on perceived dance quality, masculinity, strength and fitness.

Results: Ratings revealed positive links between strength and dance quality; biomechanical analyses showed that better dancers made faster movements overall as well as larger and more varied movements of the upper body. Unfortunately no clear links were found between cardiovascular fitness.

Conclusions: We conclude that male dance conveys cues that are important in female mate choice and link perceptions of male dance to several biomechanical variables. However, we identify several possible problems in assessing male cardiovascular fitness as well as critical directions for future research that is required to advance our understanding of the field.

Male nonverbal behaviour during dating is affected by women's menstrual cycle

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Objectives

In previous years, researchers have found fluctuations in physical attractiveness and behaviour during women's menstrual cycle, commonly peaking around ovulation. However, it was not examined so far, whether these changes affect men's behaviour. The aim of this study was to test differences in nonverbal expressions of men interacting with women in the follicular and luteal phase of their menstrual cycle.

Methods

The study used a speed-dating paradigm, in which each person meets with several people of the opposite sex for only 3 minutes. For the purpose of this study, we analyzed 391 videotapes from speed-dating of 92 men interacting with women who were in the follicular (187 interactions) or luteal (204 interactions) cycle phase. We recorded specific behavioural acts (8 expressions) and states (10 expressions). Based on previous research, these behavioural components loaded into two factors: expressions of interest and expressions of disinterest. Differences between scores in these two factors and length of individual behavioural states when interacting with women in the follicular/luteal phase were compared by paired t-test.

Results

We found no significant differences in overall score of interest or disinterest in relation to the women's menstrual cycle. However, men communicating with women in the fertile phase spoke significantly longer than those communicating with women in the luteal phase of the cycle.

Conclusions

Our results indicate that women's menstrual cycle affects men's behaviour, however in a relatively specific manner. It also supports the Scheherazade effect theory, which claims that at the origin of human speech stood the effort to entertain potential mates.

#47

Tall, dark and handsome? Female preference for masculinity in male facial skin colour.

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Objectives: Women's preference for facial masculinity in men is equivocal. However, while research to date has emphasised sex differences in face shape, facial skin colouration has received little attention. Skin colour is highly sexually dimorphic across ethnicities and may act as a signal of mate quality. Following oestrogen exposure during puberty female skin lightens, resulting in a consistent sex difference in skin colour during adulthood. Men have not only darker but also yellower and redder skin than women. Here we test women's preference for masculinity in facial skin colour.

Methods: Participants adjusted the skin colour of facial composites in order to make the face look 1) most attractive and 2) most sex typical. Skin colour of each face could be adjusted in accordance with the difference between average male and average female skin colour. Participants could transform face colour over the range of +300% hyper-masculine to -300% hyper-feminine colouration.

Results: Women consistently exaggerated male-typical facial colouration in order to make male faces look most masculine and most attractive. Male-typical colour was exaggerated to a lesser extent (approx. 24%) when making the face most attractive than when making it most masculine (approx. 67%). The magnitude of applied skin colour change was significantly associated with the starting colour; males that were dark and red originally were changed in colour least.

Conclusions: Sexual dimorphism was accurately enhanced to make faces appear masculine. While the most attractive skin colour was not the most masculine it was more masculine than the average male face. This study provides evidence for a preference for skin colour masculinity in male faces.

#48

Opposite-sex siblings decrease attraction, but not prosocial attributions, to self-resembling opposite-sex faces

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Objectives

One model of human kin recognition (Lieberman, Tooby & Cosmides, 2007 *Nature*) suggests that contextual cues of genetic relatedness, such as cosocialization and maternal–perinatal association, affect the perceived probability of genetic relatedness, which in turn modulates prosocial and inbreeding-avoidance behaviours toward specific, familiar potential siblings. Here (DeBruine et al., 2011 *PNAS*), we test a more general alternative model in which contextual cues of kinship can influence the kin-recognition system by changing how the mechanisms that regulate social behaviour respond to cues of kinship, even in unfamiliar individuals.

Methods

156 women judged the trustworthiness and attractiveness of male and female faces that had been experimentally altered to resemble their own face. Self-resemblance biases were calculated by subtracting a matched control participant’s judgments of these same faces from the experimental participant’s judgments.

Results

Having opposite-sex siblings influenced inbreeding-relevant perceptions of facial resemblance (i.e., male attractiveness) but not prosocial perceptions (i.e., male trustworthiness, female attractiveness and female trustworthiness). Women with brothers were less attracted to self-resembling, unfamiliar male faces than were women without brothers, while both groups found self-resemblance to be equally trustworthy for the same faces. This effect is stronger in women with younger, rather than older, brothers, consistent with the proposal that only younger siblings exhibit the highly reliable kinship cue of maternal–perinatal association.

Conclusions

Our findings provide evidence that experience with opposite-sex siblings can directly influence inbreeding-avoidance mechanisms and demonstrate a striking functional dissociation between the mechanisms that regulate inbreeding and the mechanisms that regulate prosocial behaviour toward kin.

#49

Mirror Neurons; wrong answer to the wrong question

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Objectives

Explain why the human Mirror Neuron System (MNS) plays no role in language origins

Methods

Analytical review of existing data, synthesizing and drawing conclusions from them

Results

According to Arbib, Gallese, Rizzolatti, and others, the MNS allows the comprehension and prediction of actions done by others and, in some fashion, imitation, mimicry and intention-reading follow. The recombination of these skills in humans supposedly leads to the development of our peculiar communication skills and, afterwards, to the development of language. But criticisms abound. Bickerton (2004) criticizes the link imitation--language, while Stamenov (2002) criticizes the usefulness of MNS in speech production. Lingnau et al. (2009) find no evidence that humans even have MNS. MNS seems to consist minimally of two components: one for object representation and one for action representation in a serialized order; but neither in object representations nor in action representations can we find an “observer” and an “agent” that could take part in “collaborative jobs” like imitation and talking. So, monkeys have MNS but no language and little imitation; humans talk and imitate, but are not known to have MNS.

Conclusions

The MNS could play a role in primate cognitive functions (object-grasping, empathy etc.), but no clear role in human-typical functions (language, mind-reading etc.). MNS appears to be the wrong answer to the wrong question: the question about the origin of language. And if we lack MNS, then the MNS-language link is not even the wrong answer.

#50

Male facial masculinity as an inter-sexual signal of quality

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Objectives

Female attraction to male facial masculinity has been heavily studied in the last two decades, and yet is still only partially understood. Evolutionary theories of human attraction draw heavily upon nonhuman literature, and currently the Immunocompetence Hypothesis dominates research into masculinity preferences. Although some studies have shown links between masculinity and some measures of health, other data from both our own field and that of microbiology have failed to support the Immunocompetence Hypothesis as applied to human face preferences. Here I summarise those literatures and present new data regarding links between masculinity and multiple measures of health condition in human males.

Methods

Undergraduate males were photographed and their faces were assessed for sexual dimorphism using multiple methods and for apparent healthiness. They also reported recent health experiences.

Results

Results were largely mixed with masculinity sometimes relating to measures of health, such that more masculine males were healthier, and sometimes showing no relationship. The relationship between masculinity and attractiveness was similarly mixed.

Conclusions

The literature investigating male masculinity as an inter-sexual signal is frequently dogged with problems relating to the variety of potential health measures and a focus on unitary explanations. Potentially fruitful avenues of research will be discussed.

#51

The Attractiveness of Humour: Effects of Relationship Context and Modality

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Objectives Evidence suggests that humour is an important part of mate choice. Previous studies have suggested that humour may serve as an indicator of genetic quality and so preferred because humour advertises good-genes in a partner. Because the genetic benefits are likely more important in short-term relationships, we investigated whether how funny an individual was rated in short video clips was related to their attractiveness as a both short-term partner or a long-term partner. We additionally tested for the presence of an attractiveness halo effect on humour: whether being physically attractive influenced how humorous a person was perceived to be.

Methods The study used 40 audio-only clips, photographs, and videos, which were rated for short-term attractiveness, long-term attractiveness, and funniness by 20 raters. The audio and video clips involved a 20 second 'desert-island' scenario, which was a unique and freeform method of capturing naturalistic humour. In the follow-up study, 10 participants rated the same stimuli for flirtatiousness.

Results The results demonstrated stronger correlations between funniness and attractiveness for ratings of men than women and that, for ratings of men and women, funniness was most strongly correlated with short-term attractiveness. We also found that attractiveness was related to funniness ratings differently across video, audio-only clips, and photographs, suggesting an attractiveness halo effect on funniness judgements. The follow-up study found that funniness was positively related to ratings of flirtatiousness.

Conclusions Funniness is more associated with short-term than long-term attractiveness. Perceived similarity between funniness and flirtatiousness may help to explain the results because flirting may be more desirable in short-term partners and may be most enjoyable when directed by attractive individuals.

#52

Self-rated attractiveness predicts preferences for opposite-sex faces, while self-rated sex-typicality predicts preferences for same-sex faces.

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Objectives

Several studies have reported positive correlations between women's own attractiveness and their mate preferences. A recent study also reported a similar correlation between men's mate preferences and their own self-rated attractiveness. Surprisingly, however, relatively little is known about the relationship between measures of own condition and men's and women's attractiveness judgments of same-sex individuals. Here, we investigated how men's and women's self-rated attractiveness and self-rated sex-typicality predict their preferences for exaggerated sex-typical shape cues in both same-sex and opposite-sex faces.

Methods

1000 women and 1000 men rated their own attractiveness and sex-typicality on 1–7 Likert scales. They also selected the more attractive face from 20 pairs of male faces and 20 pairs of female faces, where one face in each pair had a feminised shape and the other had a masculinised shape.

Results

Replicating previous findings, we showed that both men and women who judged themselves as more attractive had stronger preferences for exaggerated sex-typical shape cues in opposite-sex faces. Additionally, we showed a novel relationship between self-rated sex-typicality and perceptions of same-sex, but not opposite-sex, faces; people who judged themselves as possessing more exaggerated sex-typical traits had stronger preferences for exaggerated sex-typical shape cues in same-sex faces.

Conclusions

Our findings provide further support for models of condition-dependent mate preferences in both women and men. Additionally, while self-rated attractiveness appears to be an important predictor of men's and women's preferences for potential mates, self-rated sex-typicality appears to be a more important predictor of men's and women's preferences for potential social allies.

#53

Subjective social status, attachment and primary and secondary psychopathy in males and females

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Objectives: Social inequality has been linked to numerous, adverse health, behavioural and psychological outcomes, posing a challenge to Public Health policies (Wilkinson & Pickett, 2009). According to Richard Wilkinson (2005), inequality has a causal link with adaptive behavioural strategies characterised by competitiveness and mistrustful inter-personal orientation. Empirical studies have unraveled a link between inequality and crime, loss of social capital and low levels of personality trait agreeableness. Psychopathy, often manifested by a predatory inter-personal orientation, is a good candidate for an adaptive response to low status in an unequal society. The present study investigated possible relationships between low subjective status and parental bonds in primary or “successful” (callous, unemotional and exploitive traits) and secondary or “unsuccessful” (erratic lifestyles and criminality) psychopathy sub-types.

Methods: Two-hundred and Eighty-Five (75 males) individuals completed an on-line survey using the MacArthur Ladder as a index of inequality, together with the Parental Bonding Instrument (Parker, Tupling & Brown, 1979) and the Self-Rated Psychopathy III scale (Paulhus, Hemphill & Hare, in press).

Results: Self-rated low rank in society and recalled lack of maternal care predicted primary psychopathy, but only in females. In the male sample, neither subjective status nor attachment predicted psychopathy. Secondary psychopathy was not related to any of the measured factors.

Conclusions: Results indicate that primary psychopathy could be a facultative response in females experiencing low societal status and uncaring parenting. It is possible that a callous and unemotional inter-personal strategy functions as a tool in female-female competition for mates and resources. Future experiments are suggested for investigating primary psychopathy as an adaptive, facultative female response to adverse environmental conditions.

#54

Does facial resemblance influence social preferences in preschoolers?

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Objectives

Human sociality is characterized by cooperation within large social groups. These groups often contain a large proportion of people not personally known to a given individual. In the absence of information about a prospective social partner, what cues guide individuals to direct their cooperative behaviours toward other cooperators? Studies in adults have shown that facial resemblance is a salient cue that promotes prosociality towards conspecifics^{1,2}. These findings suggest that the detection of similarities potentially underlies cooperation among strangers. To our knowledge, the developmental origins of this ability are still unclear. In our research, we are investigating how early in life self-resemblance in others is perceived and whether similarity cues guide social preferences.

Methods

In an experimental setup, we present 6-year-old children with images of peers' faces. Using image manipulation software³ we blend the facial features of the participants with "base identities" (age-matched children). In a forced-choice design we ask participants which individual looks more like them.

Results & Conclusions

Our results indicate that 6-year-olds are successful in recognizing subtle resemblance to themselves in others. Facial self-resemblance thus potentially serves as a cue of assortment early in human ontogeny. Following on from these findings, we have been investigating whether children also prefer similar others (analyses finalized by early 2012).

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#55

Napoleon Complex? The effect of human height and strength in dyadic interactions

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Objectives Although larger size generally indicates dominance, situations in which the smaller organism acts dominantly or aggressively toward a larger other organism have been identified in non-human species. We aimed to find whether there are situations in which a shorter and/or physically weaker human male in a dyadic interaction acts more dominantly toward the other.

Methods Two males (strangers) were brought into the lab at the same time, stood up across from each other for about 10 seconds with instructions not to interact, and then sat down in separate cubicles (total $n = 42$). We manipulated the level of power they had over each other by having them play a one-shot dictator game and a one-shot ultimatum game with each other where they divided €3,60 per game. In a dictator game participants have uncontested power over the division of money, while in an ultimatum game the division of money can be contested by the other individual.

Results Results show that (perceived) low relative physical formidability affects dyadic interaction when there is no possibility for contest by the interaction partner. The shorter and self-perceived physically weaker individual of the dyad keeps more resources for himself when given absolute power over the other. We do not find these results for absolute height or absolute strength, nor do we find any effects of physical formidability when there was a possibility to be contested by the other.

Conclusions We conclude that in a situation where relatively shorter and/or weaker males have a chance to divide resources in a position of absolute incontestable power, they tend to divide the resources unfairly and benefit themselves.

#56

Predictors of Altruism in Maternal versus Paternal Half-Siblings

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Objectives

Maternal-Perinatal Association (MPA) refers to observing the relationship between one's mother and a child. MPA has been identified as a specific cue for kin detection that interacts with the effects of co-residence duration (i.e., interacts with the Westermarck effect). MPA is associated with stronger altruistic behaviours and attitudes towards younger siblings, regardless of co-residence duration, while altruism towards older siblings is positively correlated with co-residence duration (Lieberman, Tooby & Cosmides, 2007 *Nature*). Here we tested for effects of general maternal association on altruistic attitudes and behaviours towards maternal versus paternal half-siblings.

Methods

Following Lieberman and colleagues (2007), we assessed altruistic attitudes towards specified half-siblings by asking participants how likely they would be to donate a kidney to a sibling and altruistic behaviour by asking how many favours they had done for that sibling in the past month. These scores were correlated and were therefore summed to produce a composite altruism score. We also collected information about genetic relationship to the sibling (i.e., maternal or paternal half-siblings), sibling age difference (i.e., older or younger) and co-residence duration with the sibling.

Results

Both co-residence duration and maternal relatedness were positively correlated with altruism scores. However, even after controlling for the effects of co-residence duration and sibling age differences, participants reported greater altruism towards maternal half-siblings than paternal half-siblings.

Conclusions

Our findings inform models of sibling kin recognition by presenting further evidence that maternal association, even after the perinatal period, may play an important role in shaping altruistic behaviours and attitudes towards siblings.

#57

Homogamy for behavioural outputs

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Objectives

Research on assertive mating in evolutionary psychology were mostly based on the examination of “statical” phenotypical traits, like facial features and personality traits. A serious question arises whether the spouses resemble in behavioural outputs. Therefore, we decided to measure the similarity of mates in their decision making in a social dilemma situation.

Methods

To model everyday relationships, we used the Trust Game: a two-person experimental situation in which participants took part with a stranger as a playing companion. 73 mates, (146 university students) took part in the study. Their level of Machiavellianism was measured by the Mach IV-Questionnaire. Their personality traits were measured by the Zuckermann-Kuhlmann Personality Questionnaire.

Results

Significant relationship was found between the mates in the amount of offer that they made as first players - i.e. in the level of trust towards the other participant. We also found that as second players, participants reciprocate the favours of the other player to a same degree, as their partners do. Our results also show that there is a significant positive correlation between the female and male partners in the, Impulsive-Sensation-seeking personality character.

Conclusions

Our results reveal similarity between behavioural traits between mates. In a social dilemma situation they tend to trust in a stranger and reciprocate the favour they received in the similar way. Because of the fitness payoff, individuals might have been selected for psychological mechanisms that can evaluate similarity in their potential partner on the basis of their experiences on the others' behavioural strategies.

#58

Evolutionary explanations for the effect of strength on anger in men

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Objectives

1. Replicate the correlation of strength and anger in men as reported in Sell *et al.* (2009).
2. Carry out further testing of their hypothesis to explain this: that evolved cognitive mechanisms monitor dyadic resource division and compare it with counterparty strength. Their paper examined attitudes towards political aggression in order to eliminate other explanations. However this required further assumptions to derive predictions from the original hypothesis, thus its support of the hypothesis was only moderate.

Methods

1. Strength was measured using a dynamometer following Sell *et al.* (separately validated with gym exercises). Two new measurements of anger were taken: participants' expected response to described situations, and the STAXI, an existing anger scale (Spielberger, 1988).
2. Several situations were presented; they varied in counterparty involvement in undesirable outcomes for the participant (a counterparty was responsible, or the participant themselves was). Self-responsibility should preclude the involvement of Sell *et al.*'s proposed cognitive mechanisms, as comparisons of strength are irrelevant if no other person is involved.

Results

1. The correlation of strength and anger was replicated using both the described situations ($r = .30$, $n = 40$, $p = .031$) and the STAXI ($r = .27$, $n = 40$, $p = .048$).
2. There was no significant difference in anger when another person was involved or not ($r = .29 / .31$, $n = 40$, $p = .036 / .026$).

Conclusions

Converging evidence for the correlation between strength and anger in men was found. However the moderation of this correlation by counterparty involvement, as predicted from Sell *et al.*'s hypothesis, was not supported.

#59

Romantic love, attachment, and sexual desire

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Objectives: Fisher (1998) proposed that sexual desire, romantic love, and attachment are emotional systems evolved for mating and reproductive behaviours. She suggested that romantic love facilitates mate choice by limiting one's sexual desire to a particular individual, and attachment helps maintaining a pair-bond relationship for successful child rearing. My study is based on Fisher's hypotheses, and its purpose is to explore the functions of romantic love from an evolutionary perspective by seeing relationships with sexual desire and attachment.

Methods: Separate scales were constructed for each four component; romantic love, attachment, sexual desire for a partner, and sexual desire for others. These measurements were administered to 275 British males and 264 British females. Firstly, confirmatory factor analyses were conducted on responses. In the next stage, each four component was subjected to an analysis of variance/covariance to make comparisons between age, relationship length, relationship status, and childbirth.

Results: The confirmatory factor analyses confirmed that the four components were successfully measured. The analyses of variance/covariance showed that the effect of age, relationship length, and child birth were not significant. However, the result showed the significant effect of relationship status. The sexual-desire-for-a-partner-score was significantly higher for dating couples than cohabiting/married couples while the attachment-score was significantly lower for the dating couples than the cohabiting/married couples.

Conclusions: Fisher's approach suggested that the four components should alter with relationship length, and attachment should be stronger after childbirth. However, my data did not support these hypotheses. This study suggested that the decision we make to shift relationship status to more serious stage is significantly important. The importance of further research on a conscious commitment to partners was suggested.

#60

Individual and composite images of chimpanzee faces signal personality and health to humans

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Objectives

Humans and chimpanzees can extract socially-relevant information from the static, non-expressive faces of conspecifics. In humans, the face is a valid signal of both personality and health. Recent evidence shows that, like humans, chimpanzee faces also contain personality information, and that humans can accurately judge aspects of chimpanzee personality relating to Extraversion from the face alone (Kramer, King, & Ward, 2011). We sought to replicate and extend these findings using a new group of chimpanzees and two methods that minimised any effects due to photographic idiosyncrasies.

Methods

We collected personality information and photographs of chimpanzees at the Welsh Mountain Zoo. In the first study, we asked human raters to judge two individual facial photographs of each chimpanzee for various personality and health traits. Ratings were averaged across photographs for each chimpanzee, and compared with actual personality information. In the second study, we investigated the role of gender and age perceptions in accuracy. In the third study, we explored accuracy in perceptions of composite images, created by averaging multiple photographs of each chimpanzee to produce a prototype of that individual.

Results

We found that chimpanzee faces contained information relating to Extraversion and health, as well as Emotional Stability and Agreeableness, using average judgements from pairs of individual photographs. Extraversion and health information was also present in composite images of individual chimpanzees.

Conclusions

We replicated and extended previous findings using a new group of chimpanzees, and demonstrated two methods for minimising the variability associated with individual photographs. Our findings support the hypothesis that chimpanzees and humans share a system for signalling personality from the face.

#61

The other-regarding character of phatic conversational exchanges

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Objectives

Recent approaches to language evolution focus heavily on the cooperative nature of communication in humans. However, the standard accounts concentrate either on the agreement of the interactants to use a common code or on the cost/benefit analysis of the results, especially with respect to the risk of free-riding or manipulation. In our study, we were interested in examining cooperation on the social ('phatic') level of interaction, through what we call collaborative face-maintenance.

Methods

We analysed a conversational corpus of naturally occurring spoken interactions in contemporary English, expecting to find patterns of verbal behaviour not compatible with the construal of conversation as pursuit of one's instrumental goals. The study was performed with the methods of Conversational Analysis (CA).

Results

While the strategy to uphold a clash-free status of discourse was a general feature of the examined material, the analysis revealed a specific subset of exchanges, termed by us phatic exchanges, in which the propensity towards a clash-free character of interaction was particularly strong. In phatic exchanges, clash-holding assessments are very rare and when they do occur, they are mitigated through the use of silence or non-enthusiastic agreement, such as weakened agreement, token agreement, or downgraded agreement.

Conclusions

The strong tendency of phatic exchanges towards preferred (clash-free) scenarios demonstrates an other-regarding character that goes beyond a calculation of one's extradiscursive gains and losses. This may be taken as evidence for the existence of synagonal norms of discursive cooperation in conversation.

#62

An experimental tool for investigating individual interest in infants

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Objectives

Studies measuring an individual's level of interest in infants often employ a forced choice infant/adult preference task. Although meaningful differences using this method have been found in the past, it is possible that these explicit measures are not as accurate as they could be. This study compared the accuracy of a preference task to a new tool designed to implicitly measure interest in infants.

Methods

Participants completed three tasks: the Preference Task (current tool), the Count the Purple Triangles Task (new tool), and the Eye Tracking Task. The new tool consisted of an initial counting task which included infant and adult face stimuli followed by an unexpected face recognition task. Performance on these two tasks will be correlated with performance on an Eye Tracking Task measuring the amount of attention allocated to infant and adult stimuli. Finally, participants completed a short questionnaire relating to demographics, age at menarche, family composition, neighbourhood quality and plans regarding parenthood.

Results

It is expected that the new tool will produce a more accurate measure of the level of interest in infants than the current tool. Also, it is anticipated that females who have experienced more early life stress will show increased levels of interest in infants.

Conclusions

This validation study will indicate the most appropriate tool to be used in a larger study investigating the level of interest in infants in girls aged 9-14 years with varying experiences of early life stress.

#63

Fitness-relevance and memory for object features

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Objectives: According to Nairne et al. (2009) human memory systems have evolved to preferentially remember fitness-relevant information. Features were examined in a series of three association memory experiments where colour, pattern or brightness were either directly associated with a form (perception of one object) or were indirectly associated with a form (being part of the objects' background). Following Nairne et al. (2009) it would be expected that feature-associations with fitness-relevance e.g. features from the same object, should be preferentially conjoined, encoded and recognised. It would also be expected that a single exposure to a feature association has less fitness-relevance than multiple exposures (which would indicate reliable association in real world environments). It was therefore predicted that features forming reliable cues to objects would be preferentially remembered, but that this would only be demonstrated with multiple exposures.

Methods: 136 University students took part in the study. Participants encoded feature associations shown either once, or four times followed by a recognition test of memory.

Results: Significant main effects were found for colour-form and pattern-form association memory, where recognition was higher when features were directly associated with a perceptual object. This was not found for brightness-form association. Repetition significantly increased memory for feature associations.

Conclusions: It was concluded that colour-form and pattern-form associations have more fitness-relevance when the features comprise part of the same object, compared to when colour or pattern comprises part of an objects' background. Furthermore, it is more difficult to remember the brightness of an object compared to its colour or pattern, possibly because brightness is not a reliable cue for identifying real-world objects Kingdom (2008). Moreover, memory is adaptive in that feature-associations are not easily learned unless reliably associated.

#64

Current and past visual experience linked to preferences for sexual dimorphism in faces

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Objectives: Researchers have been interested in testing correlates of individual differences in preferences for varying levels of sexual dimorphism (masculinity or femininity) in judgments of physical traits such as faces or voices. These differences in preferences may reflect individualised adaptive responses to individual and environmental variables. We tested whether some of the individual differences in facial sexual dimorphism preferences can be attributed to past and present levels of exposure to male and female faces.

Methods: Over 700 adult participants were tested through an internet website. Participants adjusted 3D face images along a masculine-feminine continuum to make them look as attractive as possible. Participants also reported the number of years that they spent in single-sex schooling, and their estimation of the number of men (relative to women) in their current place of work.

Results: Men who reported a greater prevalence of men in their current working environment demonstrated increased facial masculinity preferences in male and female faces. In addition, men who had been exposed to greater numbers of male faces prior to adulthood, by longer attendance at single-sex schools, demonstrated increased preferences for masculinity in female faces in adulthood. Women's judgments did not show these effects.

Conclusions: Our findings imply that visual experiences may shape preferences long beyond the time at which the visual experience took place; we discuss possible mechanisms for this. The findings also have implications for understanding the genesis of individual differences in facial sexual dimorphism preferences.

#65

Derived embodiment

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Objectives Apparently, conceptual knowledge is sustained by so-called embodied knowledge. Hence, the question arises; How can we have knowledge about abstract phenomena such as ‘democracy’ and ‘black holes’ or even knowledge of phenomena we have never experienced such as bacteria and dinosaurs? Drawing upon studies in contemporary neuroscience and cognitive psychology, I propose that ‘derived’ embodiment is deeply involved in competent language use and, therefore, also in linguistic knowledge about abstract phenomena.

Methods My argument consists of two parts. First, I argue for a strong relationship among language acquisition, language use and the real world (i.e. the world accessible to the senses). Biological constraints in very early childhood anchor language to the body. These constraints are by-products of our evolutionary peculiarity that gain because of our physical and psychological immaturity at birth. Thus, infancy is predominantly concerned with the bodily needs and experiences of the concrete while language acquisition takes place. Particular interest in the concrete furnishes our linguistic world and installs ‘concrete’ language as the principal constituent of competent language use. Second, I argue that well-established concrete language implicitly and explicitly elicits mental representations, namely partial reactivations of sensorimotor states that occur during experience. These become associated to representations of never experienced phenomena in a process which I name ‘derived’ embodiment that sustains our ability to attribute sense to expressions of unknown referents.

Results The introduction of ‘derived’ embodiment and the exposition of three critical components of language acquisition in the individual.

Conclusions Deepening the understanding of the dynamics of ‘derived’ embodiment assists the uncovering of ontogenetic knowledge acquisition and anchors cognition to our biological origin in a very direct sense.

#66

More Masculine Men Don't Articulate as Clearly

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Objectives: In men, acoustic parameters of vocalisation (e.g. pitch, formant position) signal body size and threat potential (Puts et al., 2011). It is not clear, however, whether linguistic features of speech also signal male quality. Here we examine how one such feature, articulatory clarity, is linked to threat potential vs. prosociality.

Methods: We analysed the words 'beet', 'but' and 'boot' from speech of 176 US male undergraduates recorded by Puts et al. (2011) to extract the area size in F1-F2-space encompassed by the vowels /i:/, /u:/ and /ʌ/, as well as variant and length of final consonants. We measured body size, strength, prenatal and circulating testosterone, administered the Empathy Quotient and the Reading-the-Mind-in-the-Eyes-test, and gathered attractiveness and dominance ratings for the voices.

Results: Multiple regression analyses with vowel space and consonant features as criterion variables showed that only formant position was negatively associated with vowel space, suggesting that reduced clarity of vowel articulation is a by-product of those anatomical features of the male vocal tract that signal threat potential. In the final consonants, 34% of men produced glottal stops, 35% produced /t/'s, and the rest used both. These allophonic variants are socially marked with /t/ indexing the standard variety. Still, use of /t/ was negatively associated with lower circulating testosterone, higher pitch, and, paradoxically, greater manual strength. For speakers using /t/ exclusively, its length was positively associated with left-hand 2D:4D. Further regression analyses showed that neither vowel space nor consonant features were associated with attractiveness and dominance ratings.

Conclusions: Threat potential and masculinity reduce men's propensity to hyper-articulate and to adhere to the standard phonetic variants of their language although there is no evidence that this affects their mate value.

#67

Human Facial Expressions are Influenced by Manipulated Face Dominance

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Objectives: Modulating the intensity of facial expressions allows for a detailed, incremental mode of non-verbal communication. While expressions are dynamic, structural aspects of facial appearance are relatively stable across time, and how expressions are perceived may interact with these other aspects of facial appearance. We investigated the relationship between the perceived intensity of expressions and perceived dominance in human faces.

Methods: We measured intensity judgements of expressions, and whether these differed between faces manipulated for perceived dominance. Female and male faces exhibiting angry, fearful, and sad expressions were manipulated to look more and less dominant and were shown to participants, who were asked to judge how angry, sad, and fearful each face appeared on a 7-point Likert scale. They also completed a self-perceived dominance questionnaire.

Results: There was significant variation in rated intensity between dominant and less dominant manipulations for all three expression types across images (apart from fear in female faces). Generally, the high dominance images appeared angrier, and less sad and fearful than the low dominance images. The largest effects were seen for male angry faces, with similar but weaker effects observed in female angry faces. We also found evidence that rater's self-perceived dominance affected their intensity ratings of expressions.

Conclusions: Our results suggest that manipulating stable structural facial features attributed to dominance affect the perception of dynamic facial expressions. This may mean that observers can more easily interpret anger expressions on dominant-appearing individuals while conversely not seeing more subtle expressions of sadness or fear. This could have important consequences for how others interact with dominant and less dominant appearing individuals.

#68

Perceived aggressiveness predicts fighting performance in Mixed Martial Arts Fighters

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Objectives: Previous studies on facial perception suggest that people are to some degree able to assess personal and behavioural characteristics such as aggressiveness or fighting ability. Up to now, conducted research about assessment of fighting ability was based on subjective ratings only. Here we tested the relationship between perceived characteristics of male face and results of previous fights.

Methods: 146 photos of Mixed Martial Arts (MMA) caucasian fighter's faces and their fight scores were downloaded from the MMA division UFC website. The standardized photos were rated for aggressiveness in online survey by 237 Czech men (mean age=26.9; SD=6.2) and 448 women (mean age=26.2; SD=6.2). Possible association between fighting ability and its perception was analysed by GLM and its link to facial morphology by geometric morphometry.

Results:

Perceived aggressiveness was positively associated with proportion of fights won. However, this effect was modulated by fighter's weight. The link between wins and perceived aggressiveness remained significant for heavy-weight but not for light or middle -weights. To detect facial features responsible for attribution of aggressiveness we used shape regression. The regression of shape data on proportion of wined fights significantly predicted the facial features associated with the success in fight.

Conclusions:

Our results indicate that ability to succeed in physical confrontation is associated with perceived aggressiveness and facial morphology perhaps due to the action of testosterone. However, this is not the case in lighter weight categories where other abilities are associated with success in fights, and these may not be manifested in face.

Riotous Behaviour: A Guide for Governments

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Objectives The social and behavioural sciences should be expected to contribute both theoretical analysis, and practical suggestions concerning the recent UK riots. However, little of practical import has yet been offered. Useful qualitative analysis (e.g., Rowntree, 2011) of those involved has shown attitudes that constitute only a foreground, proximate explanation of behaviour. We seek to provide depth of theoretical understanding and practical policy suggestions by applying biological principles to these behaviours.

Methods Violence is typically seen as anti-social but much rioting was highly pro-social with coalitions formed and new outgroups and ingroups established. For example, some gang enmities were overcome. The use of new media such as Blackberries to aid in this, should not obscure the fact that coalitional violence is an ancient facultative strategy. Analysis drawing on foraging and coalitional models derived from behavioural ecology sees violence as facultative when the potential trade-offs, low risk versus high reward, are sufficient. Using these insights we analyse data from the recent riots drawn from arrest, background and sentencing reports using such models.

Results We show that--as life history theory predicts--risk-taking behaviours make sense against a background of cues to highly unequal life-history outcomes. Much of the rioting was highly coalitional and can be understood in pro-social (in group) terms.

Conclusions Implications to policy makers—such as reducing inequality and outgroup cues are discussed. E.g., while increasing potential costs of riotous behaviour through highly punitive responses may work to some extent--this will carry costs of its own--especially if this contributes towards background cues of unfairness that drive such behaviour. In addition, energies and attitudes shown by rioters could be redirected into personally and socially profitable areas.

#70

Wearing red enhances perceived dominance, aggression and confidence

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Objectives: Red colouration is a sexually selected trait associated with dominance in a variety of animal taxa, and has similar psychological and cultural associations in humans. Because human skin redness varies with health, hormones and emotional state, we hypothesised that artificial red stimuli may exploit a perceptual bias that evolved to support rapid social judgements. The main aim of this study was to experimentally investigate whether wearing red influences perceived personality attributes relative to blue or grey clothing colour, and whether results vary with gender.

Methods: 100 subjects (50 males and 50 females, average age 22.97) rated digitally manipulated photos of men for trustworthiness, aggression, dominance, and confidence on a 7-point scale. Each image was presented in three chromatically manipulated conditions (red, blue and grey), adjusted for luminance. Participants also categorised the emotional state of these stimuli.

Results: Main effects of colour were found for perceived aggressiveness, dominance, and confidence. Red stimuli were rated as more aggressive, more dominant and more confident than blue or grey stimuli. For dominance there was a significant interaction between stimulus colour and gender of rater, with males but not females showing a significant effect. In the categorisation test, images were significantly more often categorised as “angry” when presented in the red condition.

Conclusions: The results from this experiment confirm previous studies by demonstrating an effect of the colour red on human social perception, consistent with the sexual selection hypothesis whilst not excluding cultural influences.

#71

What's in a face? And what isn't?

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Objectives In a recent study we found that women were able to accurately detect, and express preferences for, athletic ability from the male face. In the same study we found that women could not detect verbal fluency from the face, although they preferred a composite face constructed from the faces of males with low fluency over one constructed from faces of males with high fluency. In the current study, we investigated the facial attributes that contribute to judgements of athleticism and fluency.

Methods From 23 Caucasian men (age: 20.43 (4.56)) we obtained information about height and weight and tested athletic ability (running time) and verbal ability (verbal fluency tests). Athletic and verbal abilities were positively correlated in this sample. We then presented these men's faces, aligned on inter-pupillary distance and masked to obscure hair, to female raters who rated them for attractiveness, verbal fluency, athletic ability, health, masculinity and dominance. Each attribute was rated by a different group of individuals, to avoid halo-effects.

Results PCA revealed two factors, one with high loadings of attractiveness, health, verbal fluency and athletic ability ("attractiveness" factor) and the other with high loadings of dominance and masculinity ("masculinity" factor). Multiple regression analyses showed that the attractiveness factor was positively associated with height and negatively with weight, whereas the dominance factor was only positively associated with height. Perceived verbal and athletic abilities did not correlate with actual abilities.

Conclusions Results confirm previous findings that masculinity is not typically considered attractive in UK samples, and that height is associated with male threat potential and dominance (Puts et al., 2011). They also are consistent with an attractiveness halo effect in which positive traits, including athletic ability and verbal fluency, are attributed to attractive individuals rather than directly recognised in the face.

#72

Influence of pupil dilation on visual attention

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Following the work of early ethologist Eckhard Hess, a number of recent researchers have examined the effect of observed pupil dilation on human behaviour. For instance, women and men differ in their preference for small, medium or large pupil-size and female preference for larger pupils is modulated according to menstrual cycle. In a series of four experiments the present work examined the degree to which dilated, as opposed to constricted pupils, can influence an observer's *attention*. Variants of standard visual attention paradigms were employed in which participants are required to make a speeded response to the presence of a target letter. Importantly, the target was either associated with dilated or constricted pupils. We find that although dilated pupils on a peripheral face do not attract attention, dilated pupils on a face already attended and gazing to a peripheral location are more effective at shifting a person's attention. Furthermore, we find that attention is relatively slow to disengage from dilated pupils on an attended face that does not gaze to a peripheral location. These results represent the first demonstration of how pupils modulate visual attention.

#73

Judgments of Female Attractiveness across a Female Observer's Menstrual Cycle

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Objectives

This project studied female judgments of mate rival attractiveness throughout the menstrual cycle. This is of key importance, as female intrasexual-competition is central to reproductive success, and understanding of this issue is limited.

Methods

For the main study, 26 female observers rated photographs of 30 female faces and bodies for attractiveness and femininity, at various points throughout the menstrual cycle. During ratings observers' eye-movements were recorded to determine the visual cues attended to. Eye-movement analysis focuses on identifying shifts in visual attention when assessing mating rivals, according to observer fertility status.

Additionally, in a series of online studies, the photographs were rated for attractiveness, femininity and perceived fertility, by 81 male and 92 female observers, in order to measure sex differences in judgments.

Results

Ratings of facial attractiveness and femininity were higher during low fertility, as were ratings of bodies for femininity. Our eye-movement data allows us to compare the visual cues on the face and body which are attended to during low and high fertility observations. Online studies highlighted an overestimation bias in ratings made by female observers for attractiveness, femininity, and perceived fertility of mating rivals, relative to ratings made by male observers.

Conclusions

Underestimating the mate value of rivals is likely to have been particularly costly throughout evolutionary history, and thus selected against. Such costs may be inflated during low fertility when female attractiveness is lowest and relative intrasexual-competition is highest. Identification of any ovulatory shifts in the visual cues attended to, through eye-movement analysis, may shed further light on this.

#74

Men's preferences for face shapes of women in their fertile menstrual cycle phase.

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Objectives Several studies have revealed that there may be perceptible cues to ovulation in humans. This study aims at extending these findings by using female faces that were shape transformed towards luteal and follicular prototypes.

Methods Follicular and luteal prototypes were created by averaging 20 photographs taken of females in the late follicular phase of their cycle (ovulation), and 20 photographs of the same women during the luteal phase. Twenty different female faces were then shape transformed towards the luteal prototype and towards the follicular prototype, in 50% and 100% steps. Faces were then paired, so that the pair-differences were either 100% or 200%. Thirty-six heterosexual male participants were asked to choose the more attractive (Task 1), the more caring (Task 2), and the more flirtatious face (Task 3), and the face, with which the participant would have better chances to get a date with (Task 4).

Results For all tasks we found a significant preference for the follicular face (all p 's < .01). In trials with a pair difference of 200% the preference for the follicular stimulus was significantly stronger than in trials with a 100% distinction.

Conclusions We conclude that subtle shape differences in faces are sufficient to trigger men's preference for a woman in her fertile cycle phase. Interestingly, men seem to show this preference in all four tasks, not just in tasks that ask for choices that are relevant for reproduction.

#75

Changes in body weight predict attractiveness ratings in male and female bodies which vary in leg and torso length.

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Objectives:

Several studies have suggested that varying the ratio of the leg to torso in human bodies modulates attractiveness judgements. Longer legs indicate better childhood nutrition and shorter legs have been associated with adverse health problems. However, previous studies have co-varied leg length and torso length. Moreover, body weight has long been known to covary with these features. Could it simply be that the bodies are rated as more or less attractive because their apparent body weight changes?

Methods

Four sets of pictures were created for male and female bodies. One in which the leg length was altered, one in which the torso leg was altered and two in which both torso & leg length were altered (allowing height to alter in one set and keeping it constant in the other). Participants rated the images for body weight, age or attractiveness.

Results

Analysis of the results suggested that both for male and female bodies, longer legs and shorter torsos are rated as more attractive. However, when estimated body weight and age is included as a predictor, alongside torso and leg length and leg-torso ratio, the primary predictor of the attractiveness judgements.

Conclusions

Altering the proportions of the body also alters its apparent body weight and it is that change that alters attractiveness.

#76

Development of facial attractiveness preferences from 8 years old to adulthood.

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Objectives – Facial masculinity and femininity are known to be critical to facial attractiveness judgements in adults possibly as cues to health, fertility and personality. This work aims to assess the development of perceptions of attractiveness in both male and female faces.

Methods – Computer graphics were used to produce pairs of matched face images which differed in gender but no other quality. Child (8, 11 and 14 year-old) and adult participants rated the attractiveness of the matched male and female faces separately using two Q-sorts.

Results – Overall, there was high agreement between age groups in judgements of attractiveness, with the similar facial qualities being found attractive independent of the sex of participant and the gender of faces being judged. With the exception of 14 year-old males viewing male faces, participants found the more feminine male and more feminine female faces more attractive than the less feminine faces. However, with the exception of 8 year-old children, femininity was more preferred by participants in female faces than in male faces.

Conclusions – Thus, although puberty does not seem to be important in the development of adult like attractiveness judgements generally, it would seem to be key to the development of preferences from different levels of sexually dimorphic characteristics in male and female face in both males and females.

#77

Early childbearing, reproductive flexibility, and kin networks in Hampshire, UK

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Objectives:

In humans, there is a strong relationship between an earlier age of first birth, short life expectancy and low income, as predicted by life history theory. Less is known at the psychological level about individual perceptions of risk and uncertainty, and the extent to which people are consciously aware of or plan their fertility decisions. There is also some evidence for cooperative breeding in humans, so we examined the effect of kin and non-kin networks have on fertility decisions. We compared the life history theory and cooperative breeding predictions with alternative hypothesis to explain reproductive variation.

Methods:

335 girls (13-19 years) in schools throughout Hampshire completed an anonymous survey about their fertility decisions, kin networks, perceptions of risk, and attitudes towards safe sexual practice.

Results:

As well as socioeconomic status ($p=0.05$), grandparental investment ($p=0.019$), subjective life expectancy ($p=0.001$), and perception of environmental risk ($p=0.044$) were significantly associated with early age of first birth. Also subjective knowledge of safe sexual practice ($p=0.32$) was associated with an earlier age of first birth but not objective knowledge of safe sexual practice. Parental investment ($p=0.022$) and grandparental investment ($p=0.001$) were associated with an increase in desired number of children.

Conclusions:

Girls with close parental and grandparental ties may be embedded in cooperative breeding networks and want more children than those who are not. As well as socioeconomic status, perceptions of environmental risk and uncertainty predict age of first birth. Girls may to some extent consciously plan adaptive childbearing strategies according to their environment.

#78

Encephalization and the Evolution of Human Fission-Fusion Dynamics

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Objectives

Layton and O'Hara, in "Human Social Evolution: A Comparison of Hunter-gatherer and Chimpanzee Social Organization" (2010), posit the band structure as a social unit unique to human sociality. The lack of a band structure in chimpanzee society demonstrates a differential social response to physiological and ecological conditions. They note that ethnographic evidence demonstrates a higher protein quotient in the diet of hunter-gatherer communities. The *expensive tissue hypothesis* elucidates the energetic effects and thus dietary shifts anticipated due to encephalization. The energetic demand of the modern brain is far greater than that of even our closest living relative (human brain BMR = 14.6 watts (Aiello and Wheeler 1995, 200) whereas *P. troglodytes* brain BMR = 2.6 watts), shifting the human diet toward high quality foods. Layton and O'Hara (2010) posit that due to the reduction in carrying capacity caused by a carnivorous exploitation regime, within overlapping ecological ranges, hunter-gatherers can only maintain a population density of 0.23 agents/km² whereas chimpanzees can maintain a population density of 2.5 agents/km². This analysis attempts to test for the emergence of modern encephalization in the human paleontological record and thus the potential physiological mechanism that may have structured the evolution of a band sociality.

Methods

Utilizing information on cranial volume from Aiello and Dunbar (1993) and Rightmire (2004), a dataset was compiled in order to analyze the emergence of a modern brain mass.

Results

According to this analysis, the emergence of modern encephalization occurred with the evolution of *Homo heidelbergensis* (average specimen age of 480kya). Comparing *Homo heidelbergensis* and extant humans demonstrates no statistical difference $p=0.21$ (whereas *H. heidelbergensis/H. erectus* $p=0.0008$).

Conclusions

The evolution of a modern brain mass ~500kya implies a similar energetic demand from *Homo heidelbergensis* to *Homo sapiens*

#79

Regional Variation in Pathogen Prevalence Predicts Endorsement of Group-Focused Moral Concerns

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Objectives

According to Moral Foundations Theory, people endorse "individualizing" foundations (Harm/care, Fairness/reciprocity) or "binding" foundations (Ingroup/loyalty, Authority/respect, Purity/sanctity) to varying degrees. Societies with higher pathogen prevalence have been found to exhibit more pronounced anti-pathogen psychological tendencies (e.g., conformity) and values (collectivism). As endorsement of the binding foundations may promote adherence to traditions and norms, and promote avoidance of sources of disease, we hypothesized that pathogen prevalence may predict endorsement of the binding foundations, which may also serve to reduce pathogen transmission.

Methods

We examined associations between historical and contemporary pathogen prevalence and endorsement of the moral foundations via country-level and multi-level analyses. As estimates for regional pathogen prevalence we used existing indexes. As measures of endorsement of the moral foundations we used data from a large sample of volunteers who completed an online survey.

Results

Country-level analyses showed that even when controlling for gross domestic product per capita, historical (but not contemporary) pathogen prevalence predicted endorsement of the binding foundations, but not individualizing foundations. Multi-level analyses showed that this pattern held even when controlling for individual-level variation in political orientation, gender, education, and age.

Conclusions

These results support previous observations of an association between pathogen prevalence and cross-cultural differences in anti-pathogen psychological tendencies and societal values and highlight the utility of a functional–evolutionary approach to understanding patterns of morals across societies and individuals.

#80

Social networks and fitness payoffs in rural Ethiopia

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Objectives: While there is extensive evidence that patrilineal and matrilineal kin impact on a woman's reproductive success in non-industrialized populations, studies investigating the impact of friendship networks are scarce. The aim of this study is to identify the effect of network content and structure on women's fitness payoff using data from an agro-pastoralist population of rural Ethiopia.

Methods: Data on friendship networks were obtained by asking female respondents to name up to five other women with whom they talked most. The composition of the friendships network (kin, non-kin, unrelated) was also informed, along with the frequency of contact. We used event-history analyses to predict the impact of network size, centrality and composition on child survival and fertility.

Results: Centrality measures were found to be positively linked to reproductive success, in particular child survival. Additional results hint at the importance of close-living friends whereas the boundedness (e.g. kin vs. friends) of a network did not play an important role towards fitness payoff.

Conclusions: A woman's social network is crucial for child's survival. In consequence of patrilocal and possible polygynous marriages, a woman's social status is low. We argue that women with higher network centrality have higher social status in the community and possibly increased access to resources. The revelation that the composition of a social network and its deriving fitness payoff does not correlate with kin but general friends offer perspective to discuss the role of network reciprocity for the evolution of helping behaviour.

#81

Factors Affecting the Reproductive Success of British Grandmothers

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The objective of this research was to find out which of a number of factors in a woman's life (or her perception of those factors) were associated with higher fitness.

Method:

In 1998 and 1999 I asked 119 women (mean age 73) to fill in a detailed questionnaire about their lives and their beliefs about or perception of their lives. This yielded information about their own reproductive success (children and grandchildren) and that of their mothers and also factors which have been suggested as possible influences on reproductive success and reproductive decisions.

Results:

- The only factor found to influence how many children a woman had was her year of birth.
- The only factor found to influence how many grandchildren she had was how many children she had had.
- The factors found *not* to influence number of children included:
 - The woman's perception of her financial security as a child or adult, support from husband, practical and financial support from family and in-laws, the comfort and happiness of her childhood or her marriage.
 - Her years in education, whether she worked, social class indicators.
 - The number of siblings she had.
 - Whether she reported using birth control.
- 19% said they would have liked more children compared to 7% who wanted fewer.

Conclusions:

These results provide no support for any hypothesis about ecological factors thought likely to influence reproductive decisions and none even trended in a direction suggesting further research with a larger sample would be worthwhile. These negative results convinced me to change the direction of my PhD research and I never reported them except as part of my thesis. On reflection, I think negative results like these should be reported and discussed.

#82

Are wealth and social networks the source of different migration strategies in Southern Ethiopia? An evolutionary approach.

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Objectives

This study explores migration strategies at individual and household level in contemporary Ethiopian rural and urban populations using an evolutionary perspective. Due to recent demographic and economic changes, new generations of rural households face a problem of land access. Evolutionary theory predicts that resource scarcity is one of the main explanations for dispersal by encouraging some particularly resource limited households to invest in migration. Social capital approach (social networks, social norms and sanctions associated) predicts that wealthier individuals are characterized by extended social network and are more likely to migrate. Because evolutionary and social capital models share the notion of behaviour optimization, wealth effect, social networks and their social norms are explored.

Methods

Anthropological, demographic and economic data were collected from 472 rural-urban migrants and from 550 rural households in Southern Ethiopia. Focus groups and in-depth interviews were also conducted. Multivariate, logistic and general linear model, using SPSS software, were used to analyze the effect of resources on the decision to migrate.

Results

Household's wealth has an impact on migration: both the wealthiest and the poorest households are the most likely to migrate, but for different reasons, suggesting a u-shape relation. Qualitative urban and rural data confirm these results; individuals from wealthier households are more likely to migrate because of their extended network to cities, and because they are more sensitive to the attraction of the urban life, and the prestige associated. Individuals from the poorest households, even without networks or knowledge of city life, are pushed out to city due to the resource shortages within the household.

Conclusions

Expectations, gender bias, and success are also different between wealth groups, suggesting risk assessment and behaviour optimization vary at the individual and household level.

#83

Fitness effects of pro-social behavior

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Objectives

As very little is known on the association between cooperative behavior and fitness in humans we examined fitness correlates of human cooperation in a real life setting. We investigated whether pro-social attitude, proxied by self reported voluntary work, is associated with lifetime reproductive success. We further investigated whether marriage affects the association between pro-social attitude and offspring number, examining whether individuals who are devoted more strongly to pro-social activities tend to remain unmarried and hence have fewer children.

Methods

We analyzed public data from the Wisconsin Longitudinal Study (n = 2545 men, 2967 women) and from the German General Social Survey 2006 (n= 1454 men, 1492 women).

Results

In both samples, a pro-social attitude was associated with higher offspring number in men, whereas it was associated with a lower offspring count in women. This sex difference remained essentially unchanged if marital status was considered. We speculate that evolutionary forces leading to pro-social behavior might differ between the sexes. In men, cooperative behavior appears to have direct fitness benefits.

Conclusions

We assume costly signaling and reciprocity as potential underlying mechanisms. In women, we suppose that pro-social attitude might be rather associated with indirect benefits where women profit from cooperation among kin. Previous findings of fitness enhancing effects of kin cooperation among women support this argumentation. We conclude that analyzing real life settings may help to explain the evolutionary forces leading to human cooperation.

#84

The relationship between early life conditions and later reproductive history in the Newcastle Thousand Families Study

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Objectives:

Adverse conditions in early life influence later life history outcomes: several studies have shown that childhood adversity reduces age at first birth. However, few have been able to investigate how early life conditions influence total reproductive output, because this requires extended periods of data collection. The current study investigated the effects of poor childhood housing conditions and low socio-economic status on age at first reproduction and total live births. We further investigated if these relationships differed between the sexes.

Methods:

Around a thousand babies born in Newcastle-Upon-Tyne in 1947 were surveyed intensively for the first 15 years of their lives and then followed up sporadically, most recently in 1997, when the cohort members were aged 50. This presents a rare opportunity to investigate the influence of early childhood adversity on lifetime reproductive output as well as age at first birth.

Results:

Our results show that for boys, poor housing conditions during childhood has an accelerating effect on age at first birth, even after adjusting for social class, which is also a significant predictor of early first births. For girls, however, both low social class and poor childhood housing conditions appear to be of little importance for reproductive timing. In neither sex, however, are these markers of childhood adversity correlated with total number of births.

Conclusion:

Our results also show that while adverse early conditions may affect reproductive scheduling, total reproductive output is not influenced by early life conditions.

#85

Comparative analysis of intergenerational influences on fertility in the developing world

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Objectives:

It has been suggested that human mothers are cooperative breeders as they need help from others to successfully raise offspring. We test the hypothesis arising from this theory that kin influence fertility decisions. With help, one would expect that human mothers can improve their reproductive success in many ways.

Methods:

We conducted analyses of the Demographic and Health Surveys (DHS) to determine the influence of kin on fertility across a range of populations in the developing world. DHS are ideal for a comparative analysis of this topic, as they collect a rich array of data on demographic outcomes, household composition and socio-economic variables using standardised methodologies. We used path analysis to determine not just whether kin have any influence on fertility, but also to explore the pathways through which any influence is exerted.

Results:

Our results demonstrate that the presence of family members is correlated with fertility, but that the precise relationships between individual kin and fertility outcomes vary between populations. There is, however, some consistency in that living with maternal kin tends to extend birth intervals, resulting in fewer children born, while living with paternal kin tends to reduce birth intervals and leads to higher fertility. Such effects may be partly mediated by correlations between kin and intervening variables such as education and contraceptive use.

Conclusions:

Our results support the hypothesis that kin availability is associated with fertility outcomes, but demonstrate variation in how these effects play out for different types of kin and in different populations.

#86

Blood is thicker than water: Biological grandparents invest more

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Objectives: The grandmother hypothesis and related perspectives propose that it is the inclusive fitness benefits grandparents gain from the 25% genetic relationship they share with their grandchildren that has lead grandparents to nurture their grandchildren. At the same time, however, allocare provided by non-kin is also essential to childhood survival and reproduction in human populations. We test the hypothesis that grandparents who are biologically related to their grandchildren, independent of potential differences in individual and family characteristics, are more likely to provide informal child care to their grandchildren than non-biologically related grandparents.

Methods: The Survey of Health, Ageing and Retirement in Europe is used for data analyses. Data were collected via computer assisted interviews across 11 countries include self-reports of 9,812 grandparents. *Grandparental investment* was taken from the question asking how often grandparents looked after their grandchildren in the last 12 months. The responses were dichotomised into *high* (“almost daily” or “almost weekly”) and *low* (“almost monthly”, or “less often”).

Results: Biological and non-biological grandparents differed significantly in a variety of background characteristics. Several of these characteristics accounted for unique variance in investment. After adjusting for the grandparents’ age, health, sex, number of descendents and employment status, distance to grandchildren, and family conflict, biological grandparents were 2.7 times ($P < 0.001$) more likely to provide high levels of investment for their grandchildren than non-biological grandparents.

Conclusions: Biological and non-biological grandparents differ in their demographic characteristics and the levels of care they provide to grandchildren. It is therefore important to take these diverse factors into account when using an integrative approach to investigate grandparental care-giving in modern societies.

#87

The (difficult) evolution of reciprocity. Why humans are special.

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A great paradox in social evolution theory concerns the gap between theoretical and empirical results regarding reciprocity. Models show reciprocity should evolve easily in a wide range of circumstances. Yet, empirically, very few clear instances of reciprocity are found in non-humans, whereas many are found in humans. This raises two questions. (1) What explains the rarity of reciprocity in non-humans? (2) What is the specific mechanism explaining that reciprocity has been able to evolve so efficiently in our species? In this theoretical (but verbal) paper, I propose a solution that answers both questions.

First, reciprocity is characterized by its *circularity*. Each partner's behaviour is adaptive because it triggers a response in the other. In result, reciprocity entails a *bootstrapping* difficulty, which is always overlooked in mathematical models. This constrains the domains in which reciprocity can evolve, which explains, I claim, the rarity of reciprocity outside humans.

Second, I show that the bootstrapping difficulty of reciprocity can be overcome only to extent that certain features of organisms end up expressed in manners for which they have not originally evolved. The extent of a species' plasticity thus determines the importance that reciprocity can end up having in this species. In humans, the plastic functions are particularly generalist, in particular in the social domain, thanks to our ability to represent others' mental states. Reciprocity is hence, like communication, a particular consequence of our ability to *mentalize*. This ability must have initially evolved for other reasons, but it has allowed reciprocity to emerge in our species as an (adaptive) by-product.

I then discuss various consequences of this finding. For instance, I show that what is called "large scale" cooperation might not be such an evolutionary paradox, because our social cognition needs not have initially evolved to produce it.

#88

Social culture in chimpanzees: grooming handclasp behaviour qualifies under conservative criteria

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Objectives

Grooming handclasp (ghc) behaviour was originally advocated as the first evidence of social culture in chimpanzees owing to the finding that some populations engage in the behaviour and others do not. In this study, we scrutinized the cultural status of ghc behaviour in chimpanzees by applying conservative criteria that emerged from the recent culture debates. We measured (i) *variation*, (ii) *durability*, and (iii) *expansion* of the ghc behaviour in four chimpanzee populations that do not systematically differ in their genetic backgrounds and live in similar ecological environments.

Methods

Ninety chimpanzees in four groups were studied in a Zambian sanctuary called Chimfunshi Wildlife Orphanage Trust. Data was collected in 2007, 2010 and 2011 by means of systematic observation, where the focus was on the identity of the handclasp individuals and their ghc styles (defined by points of bodily contact). A total of 1172 events were observed.

Results

Our results showed that two of the four groups engaged in ghc behaviour. Critically, the handclasp populations differed systematically in their expression of the handclasp styles, showed temporal consistency both within- and between-groups, and the style differences could not be accounted for by the arm length differential between partners. Ghc has been part of the behavioural repertoire of the chimpanzees under study for more than four years (surpassing *durability* criterion) and continued to spread both horizontally (9 subjects) and vertically (20 subjects; surpassing *expansion* criterion).

Conclusions

These results provide strong validation of the cultural status of the grooming handclasp behaviour in chimpanzees when assessed under conservative criteria.

#89

The dynamic cultural evolution of analytic/holistic cognitive style: Evidence from Dutch art history

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Objectives

Prior research indicates that East Asians think holistically (taking context into account) while Westerners think analytically (focusing on categories). These different cognitive styles are reflected in paintings: East Asian landscape paintings have higher horizons than Western landscapes, while Western portraits devote more space to an individual than East Asian portraits. Generally, differences in these cognitive styles are thought of as static traits of societies, as is evident from theories attributing contemporary differences between societies to their origins in either ancient Greek or Chinese culture, assuming that cognitive styles have not changed over the past millennia. This study investigates if society-wide cognitive style is static or dynamic by looking at Dutch art history.

Methods

412 Dutch portrait and landscape paintings from 1430 to 2011 were selected and measured for the face-to-frame ratio in portraits, and the relative horizon height in landscapes.

Results

Quadratic models best fitted the data. For both types of paintings the ratios were significantly lower around their vertices (for portraits at 1715, for landscapes at 1800) than in the earliest and latest measured periods.

Conclusions

Both indicators of cognitive styles clearly are dynamic, and not static. Moreover, portraits and landscapes seem to follow opposite trends: while portraits over the last 200 years are becoming more indicative of analytic thinking styles, landscapes are becoming more holistic. The analytic/holistic construct may be composed of several different, independently evolving constructs which may be linked to European social history.

#90

Mode and Tempo in the Evolution of Socio-Political Organization

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Objectives

The emergence of large-scale, complex societies since the end of the last ice age has been a major feature of human history. However, there remain many questions relating to the pattern and process of change in socio-political organization. Here I address 1) whether there are regular sequences of change in human societies, 2) the extent to which different aspects of socio-political organization co-evolve, and 3) the rate at which changes in organization occur.

Methods

Here I assess alternative models of political evolution by analyzing ethnographic data from Austronesian speaking societies of island Southeast Asia and the Pacific using phylogenetic comparative methods.

Results

Socio-political organization in Austronesian societies has evolved through a sequence of incremental steps of increasing complexity, with decreases in complexity having also occurred. There is support for models in which a number of different social and political variables co-evolve. Intermediate associations of these variables are relatively unstable and tend to show high rates of change away from such states.

Conclusions

The results support the long-debated idea that socio-political organization tends to take a limited number of forms with relatively rapid changes from one form to another. These results suggest that, despite the numerous contingent pathways of human history, there have been regularities in human cultural evolution, and that these can be detected using computational phylogenetic methods. Such an approach provides an important complement to existing approaches using archaeological and ethnographic data, and is able to address issues that are not possible with more traditional techniques.

#91

Rogers' Paradox: Resolved

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Objectives: `Rogers's Paradox of Non-adaptive Culture': is an influential model that serves as a starting point to many investigating the evolution of social learning. The model claims that, under simplifying assumptions about social learning, culture does not lead a species to be better adapted to its environment. Here we resolve the paradox, and demonstrate that Rogers's model does not lead to paradoxical conclusion.

Methods: Rogers produces 2 influential hypotheses intended to link the process of natural selection to adaptation, which rests on the fundamental theorem of natural selection. We demonstrate that these hypotheses are in fact not consistent with the fundamental theorem, with a particular emphasis on resolving the misunderstanding surrounding the 'mean fitness' of a species, and its adaptation. We then recast the model into simple mathematics and reinterpret the results.

Results: We first obtain a better grasp of the fundamental theorem of natural selection, and discuss how it relates to non-genetic evolution. We then re-analyse the model, and find that, in light of the previous discussion, it does not return paradoxical results about the adaptive nature of learned behaviour.

Conclusions: We demonstrate that a solid understanding of the fundamental theorem is vital to modelling natural selection. In particular, we must have a firm grasp on its link to the concept of adaptation. We have shown that, when the link is misunderstood, a model can appear to return 'paradoxical' results.

#92

Associations between food availability and mortality in a pre-industrial population

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Objectives: We set out to assess the impact of food availability (measured as crop yield data) on mortality and fecundity in two pre-industrial populations in south-west Finland. In particular, we were interested in whether subsets of the population were more vulnerable to the effect of low food supplies.

Methods: We used data on individual life-histories collected from around 5,500 individuals born between 1722 and 1874 from church registers in two parishes of south-west Finland, and data on harvest yields of rye and barley collected from a local estate as a measure of food availability. We used generalized linear mixed-effects models to assess the impact of crop yields on individual survival and fecundity, and to assess the impact of aging and individual social class on any effects of crop yield.

Results: Across the majority of the population, there was little impact of crop yields on mortality or on reproductive success. However, the oldest individuals in the population experienced higher mortality when crop yields were low, as did individuals in the poorest social class.

Conclusions: The results demonstrate the resilience of the population to adverse effects of crop failure, except in the oldest and poorest individuals. It is surprising that such an effect was not found in the youngest individuals, and we offer both evolutionary and behavioural explanations for the observed patterns. We compared causes of mortality in different subsets of the population, and this, along with changing selection pressures with age, is likely to contribute to the observed patterns

#93

Free riders and altruists: the effect of individual decisions on group-level cooperation

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Objectives: Individuals may have been selected for decision making mechanisms that can help to choose the optimal behavioural strategies in social dilemma situations (SDS). While former studies have revealed the typical behavioural patterns and strategies in SDSs, they paid relatively little attention to the underlying personality traits and the constraining situational factors. The present study is aimed at exploring the effects of the presence of non-cooperative (free rider) and extremely cooperative (altruist) group members on the contributions and payoffs of the other group members.

Methods: Participants (N=150) made decisions in two social dilemma situations, in cooperative and competitive versions of the Public Goods Game (PGG). Personality factors (temperament and character factors, Machiavellianism) of free riders and altruists; their contributions and payoffs; and the effect of their presence on group-level cooperation were analyzed.

Results: While the number of free riders was fairly constant in the two game settings, the number of altruists was context-dependent: this strategy appeared more prevalent in the cooperative game. A typical free rider (high Machiavellianism, low Cooperativeness, low Persistence score) was financially successful in both settings. In groups with at least one free rider member, the average contribution of other members was significantly lower in both cooperative and competitive settings. The presence of altruists promoted increase in the average contributions only in the cooperative setting.

Conclusions: While the free rider strategy was individually profitable, it decreased group-level cooperative potential. Altruism was a reliable signal of cooperativeness in the cooperative version of PGG that might induce others to behave in a group-oriented manner. Personality factors and the proportion of altruist and free rider group members seemed to be important cues for adaptive decisions in SDS.

#94

Pro-social preferences do not explain cooperation by humans in public good games

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Objectives

To directly test for pro-social preferences in public good games and to show that previous results have only allowed the post-hoc inference of pro-social preferences. By using a proper multiple treatment design we aim to show that general behaviour in such games is actually inconsistent with pro-social preferences.

Methods

We use a standard public goods game, along with two additional treatments that are structurally the same but where we have either; (1) removed all knowledge of the game and one's affect upon others, or (2) provided enhanced information during the game showing the payoffs of all group members. In addition we repeat all three treatments under conditions where cooperation is favoured to control for experimental bias.

Results

We found that: (1) when the consequences of one's behaviour for others is not known, that the same pattern of cooperation is observed; (2) an increased awareness of one's effect upon the earnings of others leads to a reduction rather than an increase in the level of cooperation, and (3) that this applies even when cooperation is favoured.

Conclusions

Overall, our results do not support a role of pro-social preferences, this is because participants are less cooperative when the consequences of their actions are made clearer, even when cooperation is favoured. Also, conditional reciprocity is not required to explain the typical result, as this is replicated even when participants are unaware of their effects upon others. Instead our results suggest that the behaviour in such games is explained by a mixture of learning and and/or a competitive desire to win.

#95

How much do fathers matter? Paternal investment effects on height in a Bristol cohort study.

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Objectives

Some studies have found that children of single mothers do just as well as children from intact families, and that father absence has little effect on child outcomes. For those who find significant father effects, many of them do not control for maternal investment. It is also questionable whether father presence is an accurate reflection of paternal investment. Looking at direct parental investment effects on height (an indicator of physical development), we examine whether fathers are important for child growth, predicting that maternal investment has greater impact on children than paternal investment.

Methods

We use clinically measured height data from the subsample of children in the Avon Longitudinal Study of Parents and Children, collected between the ages of 4 months and 6 years (final N=910). Paternal and maternal direct investments are measured by frequency of activities with the child. We conduct a multilevel random-effects regression model to explore direct parental investment effects on child height.

Results

- 1) Maternal investment has a significant association with children's height whilst paternal investment does not: High maternal investment is associated with 'shorter' children at 4months, but with an increased growth rate.
- 2) With an interaction with sex, we find that: a) High maternal investment is beneficial for both sexes, for girls more so than boys; b) Low maternal investment is more detrimental to boys than girls; c) High paternal investment is borderline significant only for girls, increasing growth slightly.

#96

Future development of 2D, 3D and video processing software for use in facial psychology research

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Objectives

The aim of this talk is to describe our existing research software (PsychoMorph and MorphAnalyser) that has been used in a wide range of evolutionary and social psychology studies, to describe recent developments and to facilitate a debate among users relating to its future development.

Methods

The main functions of the existing software are to allow:

- 1) Accurate land marking / delineation of facial images using manual and automatic methods.
- 2) The blending of individual images or 3D models to create averages / prototypical faces.
- 3) The transformation of individuals between defined groups such as male to female or young to old.

Additional features include masking, batch processing, symmetry analysis, PCA analysis and synthesis, colour calibration and many more.

Recent enhancements have included the addition of a plug-in architecture (for the 2D software, to be extended to 3D), automated methods to align groups of images and improved facial feature detection.

Results

The software has been used in several recent studies, including investigation into the effects of dominance on the short-term gaze cueing effect, the relationship between symmetry and sexual dimorphism, emotional expression's influence on perceived gaze direction and the relationship between attractive and healthy levels of facial adiposity.

Conclusions

Image analysis and processing tools have proved immensely useful in a large number of evolutionary psychology studies, in this talk we aim to engage end users in shaping the future development of the software, in order to maximise the benefit of enhancements to the evolutionary psychology community.

#97

Family matters: The impact of family level vs. individual mortality experiences on human reproductive timing

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Objectives

There is evidence that individuals confronted with high mortality environments show characteristic traits of fast life history strategies: they marry and reproduce earlier, have shorter inter birth intervals and invest less in their offspring. However, there is a lack of information in the literature regarding how mortality experiences translate into adaptations in the speed of life histories in historic human populations and on male life histories in specific. Furthermore, little is known about whether population, family or individual level mortality experiences affect life history decisions more.

Methods

In a comparative approach using regression and Event History Analyses (EHA) I study the impact of population, family and individual level mortality exposure on two central LH parameters, age at first marriage and age at first birth, in three historic human populations (Krummhörn, Finland, Québec). Mortality experience is measured as the population mean of infant and child mortality and as the number of sibling deaths an individual was confronted with until the age of 15 at the family (EHA) and the individual level (EHA stratified by family ID).

Results

Results show that both sexes can adjust the speed of their life histories according to mortality exposure. However, effects were more pronounced for males. Individuals confronted with mortality at the family level show characteristics of faster life histories.

Conclusions

This study provides evidence for the importance of environmental factors and the family environment for reproductive timing. Individual experiences seem to play only a minor role in these life history decisions.

#98

Affiliation Increases Homoerotic Motivation: The Effects of Progesterone and Priming

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Objectives: Affiliation, broadly defined, is one of the main drivers of homoerotic behaviour in nonhuman primates and appears to play a role in promoting social bonds in humans both across cultures and historical periods. However, the affiliation hypothesis of homoerotic motivation has not been directly studied in humans. Given that strengthening social bonds has an indirect positive effect on fitness, humans are hypothesized to use cues to gauge the benefits of homoerotic behaviour against the direct benefits of heterosexual behaviour. To test the hypothesis we take a multi-pronged approach, by measuring a proximate correlate of affiliative behaviour, progesterone, and priming affiliative motivation predicting that both will be positively associated with homoerotic motivation.

Methods: . In study 1, we develop a measure of homoerotic motivation by factor analyzing the responses of 960 online participants. In study 2, we correlate salivary progesterone with homoerotic motivation in 104 women. In study 3, after measuring salivary progesterone, we use a word completion paradigm to prime sexual, affiliative and neutral categories in 59 men.

Results: Our homoerotic motivation scale demonstrates good reliability. Study 2 and 3 samples are predominantly heterosexual. Salivary progesterone is correlated with homoerotic motivation in women. In men, those in the affiliation condition showed significantly greater and those in the sexual condition showed significantly less homoerotic motivation. There is also a significant interaction of progesterone and priming condition in men.

Conclusions: Results conformed to our predictions providing evidence for the adaptive function of homoerotic motivation in affiliation and social bonds.

#99

Differential maternal mortality among matrilocal and patrilocal families during the first 3 years following last birth – Evidence of an extended in-law conflict in historical Krummhörn?

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Objectives

Human mothers are assumed to receive substantial support from others. Thus, in case of any deficiency in the support a mother receives, we expect increased probability of certain depletion syndromes (e. g. increased vulnerability to diseases, eventually resulting in maternal deaths). Using data from the historical population of the Krummhörn (Germany), this study analyzes how a mother's risk of death during the first 3 years following her last birth is influenced by her fertility and local kin-structure.

Methods

Genealogical linkage of vital events for families inhabiting 27 parishes during the 18th-19th century is provided. The sample used in study consists of 907 mothers descendent from 828 natal families. Sex and number of both of the parents' siblings as well as the family's place of residence have been included as main predictors for maternal death in a Cox model stratified for birth cohorts. Covariates include maternal parity and maternal age, survival status of grandparents, and the season of the mother's last birth.

Results

Results show increased effects of parity and age at birth on maternal survival in case of patrilocal families (but not matrilocal families). Additionally, model estimates indicate only among patrilocal families (but not matrilocal families) reduced survival of mothers having sisters-in-law.

Conclusions

Consistent with predictions from kin selection theory, this study supports the assumption of patrilineal kin being less beneficial to mothers than matrilineal kin.

#100

Is disgust-based emotional selection of stories especially strong when parasite prevalence is high?

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Objectives Disgust-based emotional selection of stories was demonstrated by Heath et al. (2001) using a US sample. But is emotional selection culturally universal? Schaller (2006) predicts that disgust-based emotion selection may be especially strong in countries where parasite prevalence is high. Recent research on sharing of emotional content has demonstrated that a key factor is the level of arousal (Berger 2011). Therefore, perhaps the prevalence of parasites might lead to a degree of desensitization, such that stories with disgusting elements will create lower, not higher, levels of arousal, and consequentially less sharing of such stories. We make comparisons between India and US because prevalence of pathogens is much higher in India.

Methods Five studies were conducted online, using Amazon Mechanical Turk (AMT) and Indian and American respondents. We tested (1) willingness to pass on stories containing one of the six basic emotions (2) perceptions of pathogen prevalence (potential sources of sickness) (3) levels of arousal to disgusting and surprising stories (4) recall of high and low disgust stories (5) choice of disgusting or non-disgusting stories.

Results. Stories containing disgust or anger were less likely to be passed on in India. All (apart from one) potential sources of sickness were rated higher by Indian respondents. The level of arousal was greater for US respondents for disgusting stories and lower for surprising stories than the Indian respondents. American respondents produced better recall of the disgusting stories. Americans chose to read and transmit disgusting stories whereas Indians tended to choose non-disgusting stories.

Conclusions Our findings are congruent with the notion that desensitization to disgusting stimuli, in terms of less arousal, decrease disgust-based emotional selection when pathogen prevalence is high.

#101

Female intrasexual competition and the use of hormonal contraceptives

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Objectives

Despite its widespread use research which *critically* tests the influence of hormonal contraceptive use on mate choice and relationship processes is lacking. Using a within-subjects design in which we track participants on and off of the pill we examine the influence of hormonal contraceptive use on female-female intrasexual competition.

Methods When participants were regularly cycling we used transvaginal ultrasonography to determine conception risk and to ensure participants had an ovulatory cycle. Participants completed a questionnaire about their inclination to compete with other women when fertile, non-fertile, and when using hormonal contraceptives.

Results

Results were analysed using a linear-mixed model. Among partnered women levels of intrasexual competition were significantly higher both when fertile and non-fertile as compared to when using hormonal contraception. Effects were mediated by age as well as participants perception of their partner's attractiveness. Levels of intersexual competition did not differ across the menstrual cycle.

Conclusions

Lower levels of intrasexual competition among contraceptive pill users may manifest in a greater potential to have one's mate 'plucked' by another woman, or alternatively, may have repercussions on a women's ability to seek out alternative males. Since testosterone has been shown to influence female competition, and it is known that hormonal contraceptive use lowers testosterone levels, this may be the mechanism behind the results documented herein. This would also explain the absence of cyclical shifts in intrasexual competition as testosterone fluctuates minimally across the cycle.

#102

Truth and myth in the attractiveness ‘halo effect’?

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Objectives

Generally, good-looking individuals are judged to possess positive characteristics – being more sociable, intelligent and competent. Attractive people are often regarded as being more cooperative and are also preferred partners for cooperation. However, previous research on effects of attractiveness on trait attribution is based on natural variations in attractiveness, thus varying many other facial characteristics.

Methods

Using a method of prototype-based shape transformation, two versions of the same individual faces – an attractive and less attractive - were generated. The prototypes were created by averaging the 10 most and the 10 least attractive individuals in a set of 96 images. In two experiments – perception of trustworthiness and an Ultimatum game - we evaluated the attractiveness ‘halo effect’.

Results

Participants (258 female, 141 male) perceived more attractive female faces as more trustworthy (60%), however more attractive male faces were perceived as less trustworthy (62%). Additionally, the attractive male faces were punished more (their offers were accepted less often) if they made a lower offer in the Ultimatum game (26% acceptance rate), while this was not the case for attractive female faces (44% acceptance rate).

Conclusions

To our knowledge, this is the first experiment manipulating perceived attractiveness and the results partially contradict the attractiveness halo effect. Our results suggest that when controlling for other individual characteristics, attractiveness in male individuals does not lead to a more positive perception, possibly as a result of a rational decision that such individuals are more likely to misuse trust due to their enhanced social and mating success.

#103

Going that extra mile: Individuals travel further to maintain face-to-face contact with highly related kin than with less related kin.

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Objectives

There have been relatively few tests of Hamilton's rule in humans using an objectively quantifiable cost. Here, we examine whether the degree of biological relatedness predicts the willingness to incur a 'time cost' for maintaining a relationship. A potential (proximate) mediator for the relationship between relatedness and willingness to travel for which we test is emotional closeness.

Methods

355 participants ($M_{\text{age}}=29$ years; 72%:German; 67%:women) listed their biological kin. The coefficient of relatedness (r) was coded for each tie (>4800 ties; Mean kin listed: 14 ($SD=8.37$; four categories: .5;.25;.125;.03125). Participants listed when they last had face-to-face contact with each kinship tie (weekly contact, monthly contact) and the distance to this tie (time it took to meet up; in minutes). Finally, respondents also listed their emotional closeness to every biological relative (0 to 10). Stratified Cox regression was used to test if with increasing distance, more closely related kin are more likely to maintain contact than more distantly related kin.

Results

For both monthly and weekly contact, we found that for all comparisons, with increasing distance, individuals were more likely to maintain contact with a more closely related relative than a more distantly relative (all Hazard ratios: $11 > x > 1.5$; all $p < .02$). The only exception was the contrast between $r=.125$ vs. $r=.03125$. This was in the correct direction, however. After controlling for EC, the hazard ratios for all contrasts, with the exception of the contrasts with $r=.5$, dropped below significance. This suggested a mediation by EC.

Conclusions

Individuals generally travel further to maintain contact with close kin than with more distant kin. With the exception of parent-offspring and sibling ties, in part individuals travel further for higher related kin because they feel closer to them. These results are discussed with reference to the current literature on kin selection theory in humans.