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NOTICES

PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, do please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.

If there is a journal you feel I should be tracking on a regular basis, do let me know.

And if you have any other ideas for extending the “EAORC experience”, please contact me.

SCIENCE NEWS – Watch an example of chimpanzee ‘culture,’ as one fishes for termites

When Jane Goodall first witnessed chimpanzees using sticks to “fish” for termites, she toppled the notion that only humans use tools. Now, a new study has shown groups of chimps fish using their own cultural techniques, which they pass down to successive generations, New Scientist reports.

https://www.sciencemag.org/news/2020/05/watch-example-chimpanzee-culture-one-fishes-termites?utm_campaign=news_daily_2020-05-28&et rid=17774313&et cid=3343284

BREAKING SCIENCE – European Cave Bears Had Pure Herbivorous Diet

An isotopic analysis of fossil collagen from the bones collected in three Romanian caves indicates that the cave bear (*Ursus spelaeus*), an extinct species of bear that lived 300,000-25,000 years ago in Europe, the Mediterranean and Asia, was exclusively herbivorous.

http://feedproxy.google.com/~r/BreakingScienceNews/~3/BXQFW1VQX1M/herbivorous-cave-bears-08466.html?utm_source=feedburner&utm_medium=email

BREAKING SCIENCE – Women with Neanderthal Progesterone Gene Have Higher Fertility

A hormone called progesterone is important for preparing the uterine lining for egg implantation and in maintaining the early stages of pregnancy. Almost one in three women with European descent inherited a genetic variant of the progesterone receptor called V660L from Neanderthals.

http://feedproxy.google.com/~r/BreakingScienceNews/~3/PtrMd7MLIUo/neanderthal-progesterone-gene-08478.html?utm_source=feedburner&utm_medium=email

SCIENCE DAILY – Increased fertility for women with Neanderthal gene, study suggests

One in three women in Europe inherited the receptor for progesterone from Neanderthals -- a gene variant associated with increased fertility, fewer bleedings during early pregnancy and fewer miscarriages, according to new research.

<https://www.sciencedaily.com/releases/2020/05/200526151738.htm>

SCIENCE DAILY – Similar to humans, chimpanzees develop slowly

Researchers have systematically investigated developmental milestones in wild chimpanzees of the Tai National Park (Ivory Coast) and found that they develop slowly, requiring more than five years to reach key motor, communication and social milestones. This timeframe is similar to humans, suggesting slow maturation of the brain.

<https://www.sciencedaily.com/releases/2020/05/200526145300.htm>

SCIENCE DAILY – Cultural diversity in chimpanzees

Termite fishing by chimpanzees was thought to occur in only two forms with one or multiple tools, from either above-ground or underground termite nests. By carefully observing the techniques required to termite fish at ten different sites, researchers have created a catalog of behaviors for each chimpanzee in the study.

<https://www.sciencedaily.com/releases/2020/05/200526115048.htm>

SCIENCE DAILY – Babies know when you imitate them -- and like it

Six-month old infants recognize when adults imitate them, and perceive imitators as more friendly, according to a new study. The babies looked and smiled longer at an adult who imitated them, as opposed to when the adult responded in other ways. Babies also approached them more, and engaged in imitating games.

<https://www.sciencedaily.com/releases/2020/05/200526111251.htm>

SCIENCE DAILY – In chimpanzees, females contribute to the protection of the territory

Researchers have extensively studied several neighboring groups of western chimpanzees and their findings reveal that females and even the entire group may play a more important role in between-group competition than previously thought. They found that even though adult males seem important in territory increase, territory maintenance and competitive advantage over neighbors act through the entire group in this population of chimpanzees in the Tai National Park.

<https://www.sciencedaily.com/releases/2020/05/200527123356.htm>

SCIENCE DAILY – Analysis in Neanderthals & modern humans shows decrease in ADHD genetic variants

The frequency of genetic variants associated with attention-deficit/hyperactivity disorder (ADHD) has decreased progressively in the evolutionary human lineage from the Paleolithic to the present day, according to new research.

<https://www.sciencedaily.com/releases/2020/05/200527123344.htm>

SCIENCE DAILY – Information technology played key role in growth of ancient civilizations

A new article shows the ability to store and process information was as critical to the growth of early human societies as it is today.

<https://www.sciencedaily.com/releases/2020/05/200527105040.htm>

SCIENCE DAILY – Chimpanzees help trace the evolution of human speech back to ancient ancestors

One of the most promising theories for the evolution of human speech has finally received support from chimpanzee communication.

<https://www.sciencedaily.com/releases/2020/05/200526203555.htm>

SCIENCE DAILY – Initial Upper Paleolithic technology reached North China by ~41,000 years ago

A wave of new technology in the Late Paleolithic had reached North China by around 41,000 years ago.

<https://www.sciencedaily.com/releases/2020/05/200527150152.htm>

PUBLICATIONS

American Journal of Physical Anthropology

PAPERS

MALLIKA S. SARMA et al – Sex differences in daily activity intensity and energy expenditure and their relationship to cortisol among BaYaka foragers from the Congo Basin

The pooling of energetic resources and food sharing have been widely documented among hunter-gatherer societies. Much less is known about how the energetic costs of daily activities are distributed across individuals in such groups, including between women and men. Moreover, the metabolic physiological correlates of those activities and costs are relatively understudied.

Here, we tracked physical activity, energy expenditure (EE), and cortisol production among Congo Basin BaYaka foragers engaged in a variety of daily subsistence activities ($n = 37$). Given its role in energy mobilization, we measured overall daily cortisol production and short-term cortisol reactivity through saliva sampling; we measured physical activity levels and total EE via the wGT3X-bt actigraph and heart rate monitor.

We found that there were no sex differences in likelihood of working in common activity locations (forest, garden, house). Across the day, women spent greater percentage time in moderate-to-vigorous physical activity (%MVPA) and had lower total EE than men. Females with higher EE (kCal/hr) produced greater cortisol throughout the day. Though not statistically significant, we also found that individuals with greater %MVPA had larger decreases in cortisol reactivity.

BaYaka women sustained higher levels of physical activity but incurred lower energetic costs than men, even after factoring in sex differences in body composition. Our findings suggest that the distribution of physical activity demands and costs are relevant to discussions regarding how labor is divided and community energy budgets take shape in such settings.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24075?campaign=wolearlyview>

VIVIEN G. STANDEN et al – Violence in hunters, fishermen, and gatherers of the Chinchorro culture: Archaic societies of the Atacama Desert (10,000–4,000 cal yr BP)

This article addresses evidence of violence imbedded in both soft and hard tissues from early populations of hunters, fishermen, and gatherers, known as the Chinchorro culture, who lived between 10,000 and 4,000 cal yr BP, along the coast of the Atacama Desert, one of the driest environments on Earth. Our study is aimed to test two hypotheses (a) that interactions and violent behaviors increased through time as population density and social complexity augmented; and (b) that violence was more prevalent between local Chinchorro groups and groups from other inland locations.

The violence exerted by the Chinchorro groups was not related to increased population size, nor social complexity and was mostly restricted to individuals coming from the same coastal habitat. That is, our data suggest that violence was constant across the Archaic period among the Chinchorro, implying that violent behavior was part of the sociocultural repertoire of these populations, likely associated to mechanisms to resolve conflicts and social tensions.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24009?campaign=woletoc>

CARLY H. BATIST & JESSICA A. MAYHEW – Lateralization in seven lemur species when presented with a novel cognitive task

Asymmetrical behavior patterns are observed in many animal species, but the potential adaptive significance of lateralization and the evolutionary forces driving it remain unclear. Most laterality studies have focused on a single species, which makes interspecies comparisons difficult. The aim of this study was to examine differences in the strength and direction of lateralization in multiple lemur species when engaged in a standardized, novel cognitive task.

Overall, 62% of individuals were more lateralized than chance. However, within-genera, there were relatively equal numbers of individuals with a left- or right-hand bias, which resulted in ambipreference at the genus level. The hand a lemur used on its first success in the task predicted its overall HI value, and the strength of lateralization increased as the number of successes increased. *Varecia* had significantly higher mouth-use rates than all other genera.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24037?campaign=woletoc>

STEFANIE P. LAZOW & THORE J. BERGMAN – The structural and motivational role of the unique lip-flip movement in the gelada (*Theropithecus gelada*) facial display repertoire

Human language represents an extreme form of communicative complexity. Primate facial display complexity, which depends upon facial mobility, can be used as a model for the study of the evolution of communicative complexity. The gelada (*Theropithecus gelada*) is the only primate that can produce a lip-flip eversion. This study investigates the role of the lip-flip relative to the bared-teeth display to understand its role in generating communicative complexity.

The lip-flip was used only in combination with the essential AUs of the bared-teeth display, serving as an optional structural element added to produce a structural variant. Both the bared-teeth display with and without a lip-flip occurred most

frequently with nonaggressive, submissive behaviors. The lip-flip was more frequently preceded by approach than the bared-teeth display, especially in males. The lip-flip was also present in the majority of structurally blended facial displays though the motivation of the non-lip-flip parent display often dominated.

The lip-flip may potentially function as an indicator of benign intent after an approach or as an intensifying component of nonaggressive intent. Adaptations to increase facial mobility in geladas via facilitating the lip-flip may promote increased communicative complexity through increased conspicuousness and motivational signaling specification or intensification.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24031?campaign=woletoc>

Biology Letters

PAPERS

ANDRÉ S. PEREIRA et al with KATIE E. SLOCOMBE – Chimpanzee lip-smacks confirm primate continuity for speech-rhythm evolution

Speech is a human hallmark, but its evolutionary origins continue to defy scientific explanation. Recently, the open–close mouth rhythm of 2–7 Hz (cycles/second) characteristic of all spoken languages has been identified in the orofacial signals of several nonhuman primate genera, including orangutans, but evidence from any of the African apes remained missing. Evolutionary continuity for the emergence of speech is, thus, still inconclusive. To address this empirical gap, we investigated the rhythm of chimpanzee lip-smacks across four populations (two captive and two wild). We found that lip-smacks exhibit a speech-like rhythm at approximately 4 Hz, closing a gap in the evidence for the evolution of speech-rhythm within the primate order. We observed sizeable rhythmic variation within and between chimpanzee populations, with differences of over 2 Hz at each level. This variation did not result, however, in systematic group differences within our sample. To further explore the phylogenetic and evolutionary perspective on this variability, inter-individual and inter-population analyses will be necessary across primate species producing mouth signals at speech-like rhythm. Our findings support the hypothesis that speech recruited ancient primate rhythmic signals and suggest that multi-site studies may still reveal new windows of understanding about these signals' use and production along the evolutionary timeline of speech.

<https://royalsocietypublishing.org/doi/full/10.1098/rsbl.2020.0232>

Evolutionary Human Sciences

PAPERS

JEAN-BAPTISTE ANDRÉ & NICOLAS BAUMARD – Cultural evolution by capital accumulation

In this article, we model cultural knowledge as a capital in which individuals invest at a cost. To this end, following other models of cultural evolution, we explicitly consider the investments made by individuals in culture as life history decisions. Our aim is to understand what then determines the dynamics of cultural accumulation. We show that culture can accumulate provided it improves the efficiency of people's lives in such a way as to increase their productivity or, said differently, provided the knowledge created by previous generations improves the ability of subsequent generations to invest in new knowledge. Our central message is that this positive feedback allowing cultural accumulation can occur for many different reasons. It can occur if cultural knowledge increases people's productivity, including in domains that have no connection with knowledge, because it frees up time that people can then spend learning and/or innovating. We also show that it can occur if cultural knowledge, and thus the higher level of resources that results from increased productivity, leads individuals to modify their life history decisions through phenotypic plasticity. Finally, we show that it can occur if technical knowledge reduces the effective cost of its own acquisition via division of labour. These results suggest that culture should not be defined only as a set of knowledge and skills but, more generally, as all the capital that has been produced by previous generations and that continues to affect current generations.

{And that is why and how Brexit will destroy the United Kingdom.}

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/cultural-evolution-by-capital-accumulation/955EDA9A637BE4C59F44CE61378FCCDA>

Frontiers in Psychology

PAPERS

CHRISTIAN NAWROTH, ZOE M. MARTIN & ALAN G. MCELLIGOTT – Goats Follow Human Pointing Gestures in an Object Choice Task

Dogs (*Canis lupus familiaris*) are extremely adept in interpreting human-given cues, such as the pointing gesture. However, the underlying mechanisms on how domestic non-companion species use these cues are not well understood. We investigated the use of human-given pointing gestures by goats (*Capra hircus*) in an object choice task, where an experimenter surreptitiously hid food in one of two buckets. Subjects first had to pass a pre-test where the experimenter indicated the location of the food to the subject by a proximal pointing gesture. Subjects that succeeded in the use of this gesture were transferred to the actual test. In these subsequent test trials, the experimenter indicated the location of the food to the subject by using three different pointing gestures: proximal pointing from a middle position (distance between target and index finger: 30 cm), crossed pointing from the middle position (distance between target and index finger: 40 cm), asymmetric pointing from the position of the non-baited bucket (distance between target and index finger: 90 cm). Goats succeeded in the pointing gestures that presented an element of proximity (proximal and crossed) compared to when the

experimenter was further away from the rewarded location (asymmetric). This indicates that goats can generalize their use of the human pointing gesture but might rely on stimulus/local enhancement rather than referential information. In addition, goats did not improve their responses over time, indicating that no learning took place. The results provide a greater understanding of human–animal interactions and social-cognitive abilities of farm animals, which allows for the provision of enhanced management practices and welfare conditions.

https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00915/full?utm_source=F-AAE&utm_medium=EMLF&utm_campaign=MRK_1339331_69_Psycho_20200528_arts_A

COMMENTARIES

MANUELA SELLITTO – Episodic Future Thinking about the Ideal Self Induces Lower Discounting, Leading to a Decreased Tendency toward Cheating

A Commentary on ‘Episodic Future Thinking about the Ideal Self Induces Lower Discounting, Leading to a Decreased Tendency Toward Cheating’ by Wu, W.-H., Cheng, W., and Chiou, W.-B. (2017). *Front. Psychol.* 8:287. doi: 10.3389/fpsyg.2017.00287

https://www.frontiersin.org/articles/10.3389/fpsyg.2020.01027/full?utm_source=F-AAE&utm_medium=EMLF&utm_campaign=MRK_1339331_69_Psycho_20200528_arts_A

Language and Cognition

PAPERS

SIMON DEVLDER et al – Carving the body at its joints: Does the way we speak about the body shape the way we think about it?

Looking at the way different linguistic communities speak about a universally shared domain of experience raises questions that are central to the language sciences. How can we compare meaning across languages? What is the interaction between language, thought, and perception? Does linguistic diversity entail linguistic relativism? The literature on the naming systems of the body across languages have addressed these questions with little consensus. In the present study, we contribute to this debate with a comparison of body part terms in French, Indonesian, and Japanese. Using an updated version of the body coloring task, we observed both diversity and cross-linguistically shared patterns. Importantly, we also observed that speakers of languages which violate the wrist/ankle joint boundary rule do not collapse the distinction in thought. This key finding goes against the conflation of language and thought and leads us to conclude that linguistic diversity does not entail linguistic relativism. Methodologically, we advocate for the use of a culturally neutral etic space as a necessary tool in semantic typology. Theoretically, we propose that language is a multilevel phenomenon, which results from the interaction of non-linguistic and cross-culturally shared embodied motivations, context-specific situated language use, and culturally specific sedimented linguistic conventions.

<https://www.cambridge.org/core/journals/language-and-cognition/article/carving-the-body-at-its-joints-does-the-way-we-speak-about-the-body-shape-the-way-we-think-about-it/B0E32142BFD4EED7A7480E501CAD8AF1>

Nature Scientific Reports

PAPERS

EDUARDO NAVARRETE, MICHELE MIOZZO & FRANCESCA PERESSOTTI – Language can shape the perception of oriented objects

Seeing an object is a natural source for learning about the object’s configuration. We show that language can also shape our knowledge about visual objects. We investigated sign language that enables deaf individuals to communicate through hand movements with as much expressive power as any other natural language. A few signs represent objects in a specific orientation. Sign-language users (signers) recognized visual objects faster when oriented as in the sign, and this match in orientation elicited specific brain responses in signers, as measured by event-related potentials (ERPs). Further analyses suggested that signers’ responsiveness to object orientation derived from changes in the visual object representations induced by the signs. Our results also show that language facilitates discrimination between objects of the same kind (e.g., different cars), an effect never reported before with spoken languages. By focusing on sign language we could better characterize the impact of language (a uniquely human ability) on object visual processing.

<https://www.nature.com/articles/s41598-020-65455-6>

PAULA ESTELLER-CUCALA et al – Genomic analysis of the natural history of attention-deficit/hyperactivity disorder using Neanderthal and ancient Homo sapiens samples

Attention-deficit/hyperactivity disorder (ADHD) is an impairing neurodevelopmental condition highly prevalent in current populations. Several hypotheses have been proposed to explain this paradox, mainly in the context of the Paleolithic versus Neolithic cultural shift but especially within the framework of the mismatch theory. This theory elaborates on how a particular trait once favoured in an ancient environment might become maladaptive upon environmental changes. However, given the lack of genomic data available for ADHD, these theories have not been empirically tested. We took advantage of the largest GWAS meta-analysis available for this disorder consisting of over 20,000 individuals diagnosed with ADHD and 35,000 controls, to assess the evolution of ADHD-associated alleles in European populations using archaic, ancient and

modern human samples. We also included Approximate Bayesian computation coupled with deep learning analyses and singleton density scores to detect human adaptation. Our analyses indicate that ADHD-associated alleles are enriched in loss of function intolerant genes, supporting the role of selective pressures in this early-onset phenotype. Furthermore, we observed that the frequency of variants associated with ADHD has steadily decreased since Paleolithic times, particularly in Paleolithic European populations compared to samples from the Neolithic Fertile Crescent. We demonstrate this trend cannot be explained by African admixture nor Neanderthal introgression, since introgressed Neanderthal alleles are enriched in ADHD risk variants. All analyses performed support the presence of long-standing selective pressures acting against ADHD-associated alleles until recent times. Overall, our results are compatible with the mismatch theory for ADHD but suggest a much older time frame for the evolution of ADHD-associated alleles compared to previous hypotheses.

<https://www.nature.com/articles/s41598-020-65322-4>

THERESA RÖSSLER et al – Using an Innovation Arena to compare wild-caught and laboratory Goffin’s cockatoos

The ability to innovate, i.e., to exhibit new or modified learned behaviours, can facilitate adaptation to environmental changes or exploiting novel resources. We hereby introduce a comparative approach for studying innovation rate, the ‘Innovation Arena’ (IA), featuring the simultaneous presentation of 20 interchangeable tasks, which subjects encounter repeatedly. The new design allows for the experimental study of innovation per time unit and for uncovering group-specific problem-solving abilities – an important feature for comparing animals with different predispositions and life histories. We applied the IA for the first time to investigate how long-term captivity affects innovative capacities in the Goffin’s cockatoo, an avian model species for animal innovation. We found that fewer temporarily-captive wild birds are inclined to consistently interact with the apparatus in comparison to laboratory-raised birds. However, those that are interested solve a similar number of tasks at a similar rate, indicating no difference in the cognitive ability to solve technical problems. Our findings thus provide a contrast to previous literature, which suggested enhanced cognitive abilities and technical problem-solving skills in long-term captive animals. We discuss the impact and discrepancy between motivation and cognitive ability on innovation rate. Our findings contribute to the debate on how captivity affects innovation in animals.

<https://www.nature.com/articles/s41598-020-65223-6>

LAURA SÁNCHEZ-ROMERO et al – New insights for understanding spatial patterning and formation processes of the Neanderthal occupation in the Amalda I cave (Gipuzkoa, Spain)

The Level VII of Amalda I cave (Gipuzkoa, Spain) represents one of the latest Middle Palaeolithic occupations in the Cantabrian Region. It is characterized by the presence of Middle Palaeolithic lithic industry and animal remains, with clear evidences of anthropic and carnivore manipulation. At this site, the Neanderthal presence has been questioned in relation to the role of carnivores in the accumulation of large, medium-sized and small mammals. It has also been proposed that the Neanderthal occupation could have consisted of short-term occupations, where different activities took place in a structured space within the cave. However, all hypotheses lacked any integrative analysis of the site formation processes. With the aim of understanding these processes, a combination of spatial techniques, based on GIS and inferential statistics (density analysis, hotspots tools and palaeotopographic reconstruction), along with the taphonomic study of identifiable and non-identifiable macromammals remains, were employed. This study has revealed distinct use of the cave space by Neanderthals and carnivores. The major concentrations of lithics and medium-size mammal remains were clearly accumulated by humans at the cave entrance, while the small-size mammals were gathered by carnivores in an inner zone. The activities of the Neanderthals seem to be distinctly structured, suggesting a parallel exploitation of resources.

<https://www.nature.com/articles/s41598-020-65364-8>

New Scientist

NEWS

Earliest known man with Native American DNA ancestry lived in Siberia

A man who lived in Siberia about 14,000 years ago is the earliest known person in the world to have the specific mix of genes seen in people with Native American ancestry, analysis of DNA from a fossilised tooth has revealed.

<https://www.newscientist.com/article/2244157-earliest-known-man-with-native-american-dna-ancestry-lived-in-siberia/#ixzz6Nlk2YMld>

PLoS Genetics

PAPERS

HEINI M. NATRI et al – Genome-wide DNA methylation and gene expression patterns reflect genetic ancestry and environmental differences across the Indonesian archipelago

THIS IS AN UNCORRECTED PROOF.

Indonesia is the world’s fourth most populous country, host to striking levels of human diversity, regional patterns of admixture, and varying degrees of introgression from both Neanderthals and Denisovans. However, it has been largely excluded from the human genomics sequencing boom of the last decade. To serve as a benchmark dataset of molecular phenotypes across the region, we generated genome-wide CpG methylation and gene expression measurements in over 100 individuals from three locations that capture the major genomic and geographical axes of diversity across the Indonesian

archipelago. Investigating between- and within-island differences, we find up to 10.55% of tested genes are differentially expressed between the islands of Sumba and New Guinea. Variation in gene expression is closely associated with DNA methylation, with expression levels of 9.80% of genes correlating with nearby promoter CpG methylation, and many of these genes being differentially expressed between islands. Genes identified in our differential expression and methylation analyses are enriched in pathways involved in immunity, highlighting Indonesia's tropical role as a source of infectious disease diversity and the strong selective pressures these diseases have exerted on humans. Finally, we identify robust within-island variation in DNA methylation and gene expression, likely driven by fine-scale environmental differences across sampling sites. Together, these results strongly suggest complex relationships between DNA methylation, transcription, archaic hominin introgression and immunity, all jointly shaped by the environment. This has implications for the application of genomic medicine, both in critically understudied Indonesia and globally, and will allow a better understanding of the interacting roles of genomic and environmental factors shaping molecular and complex phenotypes.

<https://journals.plos.org/plosgenetics/article?id=10.1371/journal.pgen.1008749>

PLoS One

PAPERS

FEI PENG et al – chronological model for the Late Paleolithic at Shuidonggou Locality 2, North China

The site of Shuidonggou Locality 2 offers important evidence for the Late Paleolithic sequence of north China. The site not only contains one of the earliest instances of ornamental freshwater shell and ostrich eggshell beads in the region, but also stone artifacts with features arguably resembling the Initial Upper Paleolithic (IUP) blade technology found farther north. The appearance of these innovative archaeological forms have been attributed to the arrival of hominin populations, possibly modern humans, into the region during Marine Isotope Stage 3. Yet, the chronology of the site remains debated due to ambiguities in the existing dates. In this study, we conduct a systematical radiocarbon analysis of charcoal and ostrich eggshell samples obtained throughout the site sequence. Both acid-base-acid and the more stringent acid-base-oxidation pretreatment methods were applied to the charcoal samples. The resulting ages follow an age-depth relationship that is consistent with the stratigraphic profile. In line with previous stratigraphic assessments, Bayesian age modeling suggests that site formation history can be split into two phases: an early phase 43–35 cal kBP associated with a lacustrine depositional environment, and a later phase 35–28 cal kBP associated with rapid terrestrial silt accumulation. The chronology of the archaeological layers containing IUP-like artifacts are placed at 43–39 cal kBP and 35–34 cal kBP respectively. This finding supports the interpretation that an IUP-like blade technology appeared in the SDG region by at least ~41 ka.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0232682>

GEMA MARTIN-ORDAS, REBECA ATENCIA & SOFIA FERNANDEZ-NAVARRO – Forgetting in chimpanzees (Pan troglodytes): What is the role of interference?

Humans are constantly acquiring new information and skills. However, forgetting is also a common phenomenon in our lives. Understanding the lability of memories is critical to appreciate how they are formed as well as forgotten. Here we investigate the lability of chimpanzees' short-term memories and assess what factors cause forgetting in our closest relatives. In two experiments, chimpanzees were presented with a target task, which involved remembering a reward location, followed by the presentation of an interference task—requiring the recollection of a different reward location. The interference task could take place soon after the presentation of the target task or soon before the retrieval of the food locations. The results show that chimpanzees' memories for the location of a reward in a target task were compromised by the presentation of a different food location in an interference task. Critically, the temporal location of the interference task did not significantly affect chimpanzees' performance. These pattern of results were found for both Experiment 1—when the retention interval between the encoding and retrieval of the target task was 60 seconds- and Experiment 2—when the retention interval between the encoding and retrieval of the target task was 30 seconds. We argue that the temporal proximity of the to-be-remembered information and the interference item during encoding is the factor driving chimpanzees' performance in the present studies.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0234004>

DEREK POWELL, LIN BIAN & ELLEN M. MARKMAN – When intents to educate can misinform: Inadvertent paltering through violations of communicative norms

Paltering is a form of deception whereby true statements are used to mislead and is widely employed in negotiations, marketing, espionage, and ordinary communications where speakers hold ulterior motives. We argue that paltering is accomplished through strategic violations of communicative norms such as the Gricean cooperative principles of relevance, quantity, quality and manner. We further argue that, just as genuine paltering deceives by deliberately violating communicative norms, inadvertent violations of these norms may be just as misleading. In this work, we demonstrated that educational information presented prominently on the American Diabetes Association website violated the Gricean communicative principles and disrupted readers' performance on a test of diabetes knowledge. To establish the effects of these communicative violations, we revised the ADA's information to preserve the original content while better adhering to pragmatic principles. When these ADA explanations were judiciously revised to minimize pragmatic violations, they were transformed from misleading to educational.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0230360>

ABDULLAH ALMAATOUQ et al – Adaptive social networks promote the wisdom of crowds

Social networks continuously change as new ties are created and existing ones fade. It is widely acknowledged that our social embedding has a substantial impact on what information we receive and how we form beliefs and make decisions. However, most empirical studies on the role of social networks in collective intelligence have overlooked the dynamic nature of social networks and its role in fostering adaptive collective intelligence. Therefore, little is known about how groups of individuals dynamically modify their local connections and, accordingly, the topology of the network of interactions to respond to changing environmental conditions. In this paper, we address this question through a series of behavioral experiments and supporting simulations. Our results reveal that, in the presence of plasticity and feedback, social networks can adapt to biased and changing information environments and produce collective estimates that are more accurate than their best-performing member. To explain these results, we explore two mechanisms: 1) a global-adaptation mechanism where the structural connectivity of the network itself changes such that it amplifies the estimates of high-performing members within the group (i.e., the network “edges” encode the computation); and 2) a local-adaptation mechanism where accurate individuals are more resistant to social influence (i.e., adjustments to the attributes of the “node” in the network); therefore, their initial belief is disproportionately weighted in the collective estimate. Our findings substantiate the role of social-network plasticity and feedback as key adaptive mechanisms for refining individual and collective judgments.

<https://www.pnas.org/content/117/21/11379.abstract?etoc>

ARVID GUTERSTAM et al with MICHAEL S. A. GRAZIANO – Other people’s gaze encoded as implied motion in the human brain

Keeping track of other people’s gaze is an essential task in social cognition and key for successfully reading other people’s intentions and beliefs (theory of mind). Recent behavioral evidence suggests that we construct an implicit model of other people’s gaze, which may incorporate physically incoherent attributes such as a construct of force-carrying beams that emanate from the eyes. Here, we used functional magnetic resonance imaging and multivoxel pattern analysis to test the prediction that the brain encodes gaze as implied motion streaming from an agent toward a gazed-upon object. We found that a classifier, trained to discriminate the direction of visual motion, significantly decoded the gaze direction in static images depicting a sighted face, but not a blindfolded one, from brain activity patterns in the human motion-sensitive middle temporal complex (MT+) and temporo-parietal junction (TPJ). Our results demonstrate a link between the visual motion system and social brain mechanisms, in which the TPJ, a key node in theory of mind, works in concert with MT+ to encode gaze as implied motion. This model may be a fundamental aspect of social cognition that allows us to efficiently connect agents with the objects of their attention. It is as if the brain draws a quick visual sketch with moving arrows to help keep track of who is attending to what. This implicit, fluid-flow model of other people’s gaze may help explain culturally universal myths about the mind as an energy-like, flowing essence.

<https://www.pnas.org/content/early/2020/05/22/2003110117.abstract?etoc>

REBECCA BLIEGE BIRD et al – Fire mosaics and habitat choice in nomadic foragers

In the mid-1950s Western Desert of Australia, Aboriginal populations were in decline as families left for ration depots, cattle stations, and mission settlements. In the context of reduced population density, an ideal free-distribution model predicts landscape use should contract to the most productive habitats, and people should avoid areas that show more signs of extensive prior use. However, ecological or social facilitation due to Allee effects (positive density dependence) would predict that the intensity of past habitat use should correlate positively with habitat use. We analyzed fire footprints and fire mosaics from the accumulation of several years of landscape use visible on a 35,300-km² mosaic of aerial photographs covering much of contemporary Indigenous Martu Native Title Lands imaged between May and August 1953. Structural equation modeling revealed that, consistent with an Allee ideal free distribution, there was a positive relationship between the extent of fire mosaics and the intensity of recent use, and this was consistent across habitats regardless of their quality. Fire mosaics build up in regions with low cost of access to water, high intrinsic food availability, and good access to trade opportunities; these mosaics (constrained by water access during the winter) then draw people back in subsequent years or seasons, largely independent of intrinsic habitat quality. Our results suggest that the positive feedback effects of landscape burning can substantially change the way people value landscapes, affecting mobility and settlement by increasing sedentism and local population density.

<https://www.pnas.org/content/early/2020/05/26/1921709117.abstract?etoc>

KALEDA KREBS DENTON et al with MARCUS W. FELDMAN – Cultural evolution of conformity and anticonformity

Conformist bias occurs when the probability of adopting a more common cultural variant in a population exceeds its frequency, and anticonformist bias occurs when the reverse is true. Conformist and anticonformist bias have been widely documented in humans, and conformist bias has also been observed in many nonhuman animals. Boyd and Richerson used models of conformist and anticonformist bias to explain the evolution of large-scale cooperation, and subsequent research has extended these models. We revisit Boyd and Richerson’s original analysis and show that, with conformity based on more than three role models, the evolutionary dynamics can be more complex than previously assumed. For example, we show the

presence of stable cycles and chaos under strong anticonformity and the presence of new equilibria when both conformity and anticonformity act at different variant frequencies, with and without selection. We also investigate the case of population subdivision with migration and find that the common claim that conformity can maintain between-group differences is not always true. Therefore, the effect of conformity on the evolution of cooperation by group selection may be more complicated than previously stated. Finally, using Feldman and Liberman's modifier approach, we investigate the conditions under which a rare modifier of the extent of conformity or the number of role models can invade a population. Understanding the dynamics of conformist- and anticonformist-biased transmission may have implications for research on human and nonhuman animal behavior, the evolution of cooperation, and frequency-dependent transmission in general.
<https://www.pnas.org/content/early/2020/05/26/2004102117.abstract?etoc>

Proceedings of the Royal Society B

PAPERS

BRYCE MORSKY, MARCO SMOLLA & EROL AKÇAY – Evolution of contribution timing in public goods games

Life-history strategies are a crucial aspect of life, which are complicated in group-living species, where pay-offs additionally depend on others' behaviours. Previous theoretical models of public goods games have generally focused on the amounts individuals contribute to the public good. Yet a much less-studied strategic aspect of public goods games, the timing of contributions, can also have dramatic consequences for individual and collective performance. Here, we develop two stage game theoretical models to explore how the timing of contributions evolves. In the first stage, individuals contribute to a threshold public good based on a performance schedule. The second stage begins once the threshold is met, and the individuals then compete as a function of their performance. We show how contributing rapidly is not necessarily optimal, because delayers can act as 'cheats,' avoiding contributing while reaping the benefits of the public good. However, delaying too long can put the delayers at a disadvantage as they may be ill-equipped to compete. These effects lead to bistability in a single group, and spatial diversity among multiple interacting groups.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2020.0735>

Royal Society Open Science

PAPERS

SYLVAIN LEMOINE et al with CHRISTOPHE BOESCH & CATHERINE CROCKFORD – Group dominance increases territory size and reduces neighbour pressure in wild chimpanzees

Territorial social species, including humans, compete between groups over key resources. This between-group competition has evolutionary implications on adaptations like in-group cooperation even with non-kin. An emergent property of between-group competition is group dominance. Mechanisms of group dominance in wild animal populations are difficult to study, as they require long-term data on several groups within a population. Here, using long-term data on four neighbouring groups of wild western chimpanzees, we test the hypothesis that group dominance impacts the costs and benefits of between-group competition, measured by territory size and the pressure exerted by neighbouring groups. Larger groups had larger territories and suffered less neighbour pressure compared with smaller groups. Within-group increase in the number of males led to territory increase, suggesting the role of males in territory acquisition. However, variation in territory sizes and neighbour pressure was better explained by group size. This suggests that the bisexually-bonded social system of western chimpanzees, where females participate in territorial behaviour, confers a competitive advantage to larger groups and that group dominance acts through group size in this population. Considering variation in social systems offers new insights on how group dominance acts in territorial species and its evolutionary implications on within-group cooperation.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.200577>

BALARAJU BATTU & NARAYANAN SRINIVASAN – Evolution of conditional cooperation in public good games

Cooperation declines in repeated public good games because individuals behave as conditional cooperators. This is because individuals imitate the social behaviour of successful individuals when their payoff information is available. However, in human societies, individuals cooperate in many situations involving social dilemmas. We hypothesize that humans are sensitive to both success (payoffs) and how that success was obtained, by cheating (not socially sanctioned) or good behaviour (socially sanctioned and adds to prestige or reputation), when information is available about payoffs and prestige. We propose and model a repeated public good game with heterogeneous conditional cooperators where an agent's donation in a public goods game depends on comparing the number of donations in the population in the previous round and with the agent's arbitrary chosen conditional cooperative criterion. Such individuals imitate the social behaviour of role models based on their payoffs and prestige. The dependence is modelled by two population-level parameters: affinity towards payoff and affinity towards prestige. These affinities influence the degree to which agents value the payoff and prestige of role models. Agents update their conditional strategies by considering both parameters. The simulations in this study show that high levels of cooperation are established in a population consisting of heterogeneous conditional cooperators for a certain range of affinity parameters in repeated public good games. The results show that social value (prestige) is important in establishing cooperation.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.191567>

TIN YAU PANG – On age-specific selection and extensive lifespan beyond menopause

Standard evolutionary theory of ageing predicts weaker purifying selection on genes critical to later life stages. Prolonged post-reproductive lifespan (PPRLS), observed only in a few species like humans, is likely a result of disparate relaxation of purifying selection on survival and reproduction in late life stages. While the exact origin of PPRLS is under debate, many researchers agree on hypotheses like mother-care and grandmother-care, which ascribe PPRLS to investment into future generations—provision to one's descendants to enhance their overall reproductive success. Here, we simulate an agent-based model, which properly accounts for age-specific selection, to examine how different investment strategies affect the strength of purifying selection on survival and reproduction. We observed in the simulations that investment strategies that allow a female individual to remain contributive to its own descendants (infants and adults) at late life stages may lead to differential relaxation of selection on survival and reproduction, and incur the adaptive evolution of PPRLS.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.191972>

DAVID SOTO et al – Decoding and encoding models reveal the role of mental simulation in the brain representation of meaning

How the brain representation of conceptual knowledge varies as a function of processing goals, strategies and task-factors remains a key unresolved question in cognitive neuroscience. In the present functional magnetic resonance imaging study, participants were presented with visual words during functional magnetic resonance imaging (fMRI). During shallow processing, participants had to read the items. During deep processing, they had to mentally simulate the features associated with the words. Multivariate classification, informational connectivity and encoding models were used to reveal how the depth of processing determines the brain representation of word meaning. Decoding accuracy in putative substrates of the semantic network was enhanced when the depth processing was high, and the brain representations were more generalizable in semantic space relative to shallow processing contexts. This pattern was observed even in association areas in inferior frontal and parietal cortex. Deep information processing during mental simulation also increased the informational connectivity within key substrates of the semantic network. To further examine the properties of the words encoded in brain activity, we compared computer vision models—associated with the image referents of the words—and word embedding. Computer vision models explained more variance of the brain responses across multiple areas of the semantic network. These results indicate that the brain representation of word meaning is highly malleable by the depth of processing imposed by the task, relies on access to visual representations and is highly distributed, including prefrontal areas previously implicated in semantic control.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.192043>

MARTINA STOCKER et al – Cooperation with closely bonded individuals reduces cortisol levels in long-tailed macaques

Many animal species cooperate with conspecifics in various social contexts. While ultimate causes of cooperation are being studied extensively, its proximate causes, particularly endocrine mechanisms, have received comparatively little attention. Here, we present a study investigating the link between the hormone cortisol, cooperation and social bonds in long-tailed macaques (*Macaca fascicularis*). We tested 14 macaques in a dyadic cooperation task (loose-string paradigm), each with two partners of different social bond strength and measured their salivary cortisol before and after the task. We found no strong link between the macaques' cortisol level before the task and subsequent cooperative success. By contrast, we did find that the act of cooperating in itself led to a subsequent decrease in cortisol levels, but only when cooperating with closely bonded individuals. Two control conditions showed that this effect was not due to the mere presence of such an individual or the pulling task itself. Consequently, our study shows an intricate way in which the hypothalamic–pituitary–adrenal axis is involved in cooperation. Future studies should reveal whether and how our findings are driven by the anxiolytic effect of oxytocin, which has been associated with social bonding.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.191056>

KARRI NELDNER et al – A cross-cultural investigation of young children's spontaneous invention of tool use behaviours

Through the mechanisms of observation, imitation and teaching, young children readily pick up the tool using behaviours of their culture. However, little is known about the baseline abilities of children's tool use: what they might be capable of inventing on their own in the absence of socially provided information. It has been shown that children can spontaneously invent 11 of 12 candidate tool using behaviours observed within the foraging behaviours of wild non-human apes (Reindl et al. 2016 Proc. R. Soc. B283, 20152402. (doi:10.1098/rspb.2015.2402)). However, no investigations to date have examined how tool use invention in children might vary across cultural contexts. The current study investigated the levels of spontaneous tool use invention in 2- to 5-year-old children from San Bushmen communities in South Africa and children in a large city in Australia on the same 12 candidate problem-solving tasks. Children in both cultural contexts correctly invented all 12 candidate tool using behaviours, suggesting that these behaviours are within the general cognitive and physical capacities of human children and can be produced in the absence of direct social learning mechanisms such as teaching or observation. Children in both cultures were more likely to invent those tool behaviours more frequently observed in great ape populations than those less frequently observed, suggesting there is similarity in the level of difficulty of invention across these behaviours for all great ape species. However, children in the Australian sample invented tool behaviours and succeeded on the tasks more often than did the Bushmen children, highlighting that aspects of a child's social or cultural

environment may influence the rates of their tool use invention on such task sets, even when direct social information is absent.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.192240>

Science Advances

PAPERS

M. J. E. CHARPENTIER et al – Same father, same face: deep learning reveals selection for signaling kinship in a wild primate

Many animals rely on facial traits to recognize their kin; however, whether these traits have been selected specifically for this function remains unknown. Using deep learning for face recognition, we present the first evidence that interindividual facial resemblance has been selected to signal paternal kinship. Mandrills (*Mandrillus sphinx*) live in matrilineal societies, in which females spend their entire lives not only with maternal half-sisters (MHS) but also with paternal half-sisters (PHS). We show that PHS have more differentiated social relationships compared to nonkin, suggesting the existence of kin recognition mechanisms. We further demonstrate that facial resemblance increases with genetic relatedness. However, PHS resemble each other visually more than MHS do, despite both kin categories sharing similar degrees of genetic relatedness. This paternally derived facial resemblance among PHS indicates selection to facilitate kin recognition. This study also highlights the potential of artificial intelligence to study phenotypic evolution.

https://advances.sciencemag.org/content/6/22/eaba3274?utm_campaign=toc_advances_2020-05-29&et rid=17774313&et cid=3344755

PATRICK C. M. WONG et al – ASPM-lexical tone association in speakers of a tone language: direct evidence for the genetic-biasing hypothesis of language evolution

How language has evolved into more than 7000 varieties today remains a question that puzzles linguists, anthropologists, and evolutionary scientists. The genetic-biasing hypothesis of language evolution postulates that genes and language features coevolve, such that a population that is genetically predisposed to perceiving a particular linguistic feature would tend to adopt that feature in their language. Statistical studies that correlated a large number of genetic variants and linguistic features not only generated this hypothesis but also specifically pinpointed a linkage between ASPM and lexical tone. However, there is currently no direct evidence for this association and, therefore, the hypothesis. In an experimental study, we provide evidence to link ASPM with lexical tone perception in a sample of over 400 speakers of a tone language. In addition to providing the first direct evidence for the genetic-biasing hypothesis, our results have implications for further studies of linguistic anthropology and language disorders.

https://advances.sciencemag.org/content/6/22/eaba5090?utm_campaign=toc_advances_2020-05-29&et rid=17774313&et cid=3344755

MAÏTÉ RIVOLLAT et al with JOHANNES KRAUSE – Ancient genome-wide DNA from France highlights the complexity of interactions between Mesolithic hunter-gatherers and Neolithic farmers

Starting from 12,000 years ago in the Middle East, the Neolithic lifestyle spread across Europe via separate continental and Mediterranean routes. Genomes from early European farmers have shown a clear Near Eastern/Anatolian genetic affinity with limited contribution from hunter-gatherers. However, no genomic data are available from modern-day France, where both routes converged, as evidenced by a mosaic cultural pattern. Here, we present genome-wide data from 101 individuals from 12 sites covering today's France and Germany from the Mesolithic ($n = 3$) to the Neolithic ($n = 98$) (7000–3000 BCE). Using the genetic substructure observed in European hunter-gatherers, we characterize diverse patterns of admixture in different regions, consistent with both routes of expansion. Early Western European farmers show a higher proportion of distinctly Western hunter-gatherer ancestry compared to Central/Southeastern farmers. Our data highlight the complexity of the biological interactions during the Neolithic expansion by revealing major regional variations.

https://advances.sciencemag.org/content/6/22/eaaz5344?utm_campaign=toc_advances_2020-05-29&et rid=17774313&et cid=3344755

Trends in Cognitive Sciences

PAPERS

MAXIME DEREK & ALEX MESOUDI – Cumulative Cultural Evolution within Evolving Population Structures

Our species has the peculiar ability to accumulate cultural innovations over multiple generations, a phenomenon termed 'cumulative cultural evolution' (CCE). Recent years have seen a proliferation of empirical and theoretical work exploring the interplay between demography and CCE. This has generated intense discussion about whether demographic models can help explain historical patterns of cultural changes. Here, we synthesize empirical and theoretical studies from multiple fields to highlight how both population size and structure can shape the pool of cultural information that individuals can build upon to innovate, present the potential pathways through which humans' unique social structure might promote CCE, and discuss whether humans' social networks might partly result from selection pressures linked to our extensive reliance on culturally accumulated knowledge.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(20\)30107-8?dgcid=raven_jbs_aip_email](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(20)30107-8?dgcid=raven_jbs_aip_email)

Trends in Ecology and Evolution

PAPERS

CYRIL C. GRUETER et al – Multilevel Organisation of Animal Sociality

Multilevel societies (MLSs), stable nuclear social units within a larger collective encompassing multiple nested social levels, occur in several mammalian lineages. Their architectural complexity and size impose specific demands on their members requiring adaptive solutions in multiple domains. The functional significance of MLSs lies in their members being equipped to reap the benefits of multiple group sizes. Here, we propose a unifying terminology and operational definition of MLS. To identify new avenues for integrative research, we synthesise current literature on the selective pressures underlying the evolution of MLSs and their implications for cognition, intersexual conflict, and sexual selection. Mapping the drivers and consequences of MLS provides a reference point for the social evolution of many taxa, including our own species.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(20\)30133-6?dgcid=raven_jbs_aip_email](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(20)30133-6?dgcid=raven_jbs_aip_email)

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