

## EAORC BULLETIN 1,031 – 19 March 2023

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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, 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, let me know.

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

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### CONFERENCE ALERT – EHBEA 2023 Conference

EHBEA's 2023 Annual Conference will be held at University College London, UK, on 18 April - 21 April 2023. Registration is now open.

Members can register for the conference by visiting the EHBEA Events page here:

<https://www.cambridge.org/core/membership/ehbea/events>

Alternatively, you can register at a later date, but you must be a 2023 member to attend the conference:

For more information about the conference, please visit the EHBEA 2023 Conference website:

<https://ehbea2023.wixsite.com/ehbea-2023>

## CONFERENCE ALERT – Evolution in Action Conference

We would like to invite you to submit your abstract for our conference EVOLUTION IN ACTION

<https://www.evolution.uzh.ch/en/conference.html> taking place on Monte Verità, Switzerland, from June 11-15, 2023.

### Keynotes:

ANTHROPOLOGICAL GENETICS – Anne Stone, Arizona State University

EVOLUTION OF PLANT REPRODUCTIVE TRAITS – George Coupland, Max Planck Institute for Plant Breeding Research

### Invited Speakers:

Session PATHOGEN EVOLUTION – Francois Balloux (University College London, UK) & Eva Stukenbrock (Max Planck Institute of Evolutionary Biology, Germany)

Session POLYPLOIDY & EPIGENETIC VARIATION – Jeffrey Chen (The University of Texas at Austin, USA) & Yoav Soen (Weizmann Institute of Science, Israel)

Session DOMESTICATION – Takao Komatsuda (Shandong Academy of Agricultural Sciences, China) & Esther van der Knaap (University of Georgia, USA)

Session EMERGING TRENDS IN EVOLUTION – Tal Dagan (Christian-Albrechts University of Kiel, Germany) & Tulio de Oliveira (Stellenbosch University, South Africa)

Session ADAPTATION TO CHANGING ENVIRONMENTS – Hernán Burbano (University College London, UK) & Tábita Hünemeier (Universitat Pompeu Fabra, Spain)

Workshop MACHINE LEARNING IN EVOLUTION – Franz Baumdicker (University Tübingen, Germany) & Sara Mathieson (Haverford College, USA)

Register here : <https://www.bi.id.ethz.ch/csfweb/faces/anonymous/event/registerparticipant.xhtml>

On behalf of the Conference Committee: Simon Aeschbacher, Chiara Barbieri, Ueli Grossniklaus, Beat Keller, Verena Schünemann, Kentaro Shimizu

The Coordination Office of the URPP Evolution in Action [coordination@evolution.uzh.ch](mailto:coordination@evolution.uzh.ch)

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## NEWS

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### SAPIENS – Club-Wielding Ancestors: Myth or Reality?

Inspired by pop culture depictions of cavepeople, an archaeologist searches for elusive evidence of ancient wooden clubs.

<https://www.sapiens.org/archaeology/ancient-wooden-clubs-myth/>

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### SCIENCE.ORG NEWS – Monkey rock bashing resembles tools made by early human ancestors

Nut-smashing technique causes sharp flakes to break off.

<https://www.science.org/content/article/monkey-rock-bashing-resembles-tools-made-early-human-ancestors>

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### SOCIETY FOR SCIENCE – Honeybees waggle to communicate. But to do it well, they need dance lessons

Young honeybees can't perfect wagging on their own after all. Without older sisters to practice with, youngsters fail to nail distances.

<https://www.sciencenews.org/article/bee-honeybees-waggle-dance-communicate-lessons-learn-hive>

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### SOCIETY FOR SCIENCE – Some monkeys accidentally make stone flakes resembling ancient hominid tools

A study of Thailand macaques raises questions about whether some Stone Age cutting tools were products of planning or chance.

<https://www.sciencenews.org/article/monkey-stone-flakes-ancient-hominid-tools>

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### SOCIETY FOR SCIENCE – Good with tools? You may be a cockatoo

Editor in chief Nancy Shute talks about smart animals, from tool-using cockatoos to "self-aware" fish.

<https://www.sciencenews.org/article/good-with-tools-you-may-be-a-cockatoo>

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### THE CONVERSATION – Changes at four years old help children tell lies, play hide-&-seek and read maps

At about four, children start to understand that someone's behaviour depends on what that person believes.

<https://theconversationuk.cmail19.com/t/r-l-ttlyuik-khhllilahh-z/>

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### THE CONVERSATION – Why Old Norse myths endure in popular culture

Ancient tales of gods and heroes and medieval Scandinavia help us make sense of things like masculinity, betrayal, revenge and the end of the world.

<https://theconversationuk.cmail19.com/t/r-l-ttlidjhl-khhllilahh-g/>

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## PUBLICATIONS

### American Journal of Biological Anthropology

#### PAPERS

#### **BENJAMIN C. CAMPBELL, JOE V. HACKMAN & KAREN L. KRAMER – Development of adiposity among Ju/'Hoansi Hunter-Gatherers**

To characterize the development of childhood adiposity among the Ju'/Hoansi, a well-known hunter-gather group, to compare our results to U.S. references and to recently published results from Savanna Pumé' foragers of Venezuela, with the goal of expanding our understanding of adipose development among human hunter-gatherers.

Triceps, subscapular, and abdominal skinfolds, along with height and weight from ~120 Ju'/Hoansi girls and ~103 boys, ages 0 to 24 years, collected in 1967–1969 were analyzed using best-fit polynomial models and penalized splines to characterize age-specific patterns of adiposity and their relationship to changes in height and weight.

Overall, Ju'/Hoansi boys and girls exhibit small skinfolds with a decline in adiposity from 3 to 10 years, with no consistent differences among the three skinfolds. Increases in adiposity during adolescence precede peak height and weight velocities. Adiposity declines during young adulthood for girls and remains largely constant for boys.

Compared to U.S. standards, the Ju'/Hoansi show a strikingly different pattern of adipose development, including the lack of an adiposity rebound at the onset of middle childhood, and clear increases in adiposity only at adolescence. These findings are consistent with published results from the Savanna Pumé hunter-gatherers of Venezuela, a group with a very different selective history, suggesting that the adiposity rebound does not characterize hunter-gathering populations more generally. Similar analyses in other subsistence populations are called for to confirm our results, and help distinguish the impact of specific environmental and dietary factors on adipose development.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24715>

#### **EMILIANO BRUNER et al with SILESHI SEMAW – The endocast from Dana Aoule North (DAN5/P1): A 1.5 million year-old human braincase from Gona, Afar, Ethiopia**

The nearly complete cranium DAN5/P1 was found at Gona (Afar, Ethiopia), dated to 1.5–1.6 Ma, and assigned to the species *Homo erectus*. Its size is, nonetheless, particularly small for the known range of variation of this taxon, and the cranial capacity has been estimated as 598 cc. In this study, we analyzed a reconstruction of its endocranial cast, to investigate its paleoneurological features. The main anatomical traits of the endocast were described, and its morphology was compared with other fossil and modern human samples. The endocast shows most of the traits associated with less encephalized human taxa, like narrow frontal lobes and a simple meningeal vascular network with posterior parietal branches. The parietal region is relatively tall and rounded, although not especially large. Based on our set of measures, the general endocranial proportions are within the range of fossils included in the species *Homo habilis* or in the genus *Australopithecus*. Similarities with the genus *Homo* include a more posterior position of the frontal lobe relative to the cranial bones, and the general endocranial length and width when size is taken into account. This new specimen extends the known brain size variability of *Homo ergaster/erectus*, while suggesting that differences in gross brain proportions among early human species, or even between early humans and australopiths, were absent or subtle.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24717>

#### **EDWARD H. HAGEN et al – Homo medicus: The transition to meat eating increased pathogen pressure and the use of pharmacological plants in Homo**

The human lineage transitioned to a more carnivorous niche 2.6 mya and evolved a large body size and slower life history, which likely increased zoonotic pathogen pressure. Evidence for this increase includes increased zoonotic infections in modern hunter-gatherers and bushmeat hunters, exceptionally low stomach pH compared to other primates, and divergence in immune-related genes. These all point to change, and probably intensification, in the infectious disease environment of *Homo* compared to earlier hominins and other apes. At the same time, the brain, an organ in which immune responses are constrained, began to triple in size. We propose that the combination of increased zoonotic pathogen pressure and the challenges of defending a large brain and body from pathogens in a long-lived mammal, selected for intensification of the plant-based self-medication strategies already in place in apes and other primates. In support, there is evidence of medicinal plant use by hominins in the middle Paleolithic, and all cultures today have sophisticated, plant-based medical systems, add spices to food, and regularly consume psychoactive plant substances that are harmful to helminths and other pathogens. We propose that the computational challenges of discovering effective plant-based treatments, the consequent ability to consume more energy-rich animal foods, and the reduced reliance on energetically-costly immune responses helped select for increased cognitive abilities and unique exchange relationships in *Homo*. In the story of human evolution, which has long emphasized hunting skills, medical skills had an equal role to play.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24718>

**MARINE CAZENAVER & DAVORKA RADOVČIĆ – The Neanderthal patellae from Krapina (Croatia): A comparative investigation of their endostructural conformation and distinctive features compared to the extant human condition**

The Neanderthal patella differs from that of extant humans by being thicker anteroposteriorly and by having more symmetric medial and lateral articular facets. However, it is still unclear to what extent these differences affect knee kinesiology. We aim at assessing the endostructural conformation of Neanderthal patellae to reveal functionally related mechanical information comparatively to the extant human condition. In principle, we expect that the Neanderthal patella (i) shows a higher amount of cortical bone and (ii) a trabecular network organization distinct from the extant human condition.

By using micro-focus X-ray tomography, we characterized the endostructure of six adult patellae from the OIS 5e Neanderthal site of Krapina, Croatia, the largest assemblage of human fossil patellae assessed so far, and compared their pattern to the configuration displayed by a sample of 22 recent humans.

The first expectation is rejected, indicating that the patellar bone might have not followed the trend of generalized gracilization of the human postcranial skeleton occurred through the Upper Pleistocene. The second prediction is at least partially supported. In Krapina the trabecular network differs from the comparative sample by showing a higher medial density and by lacking a proximal reinforcement. Such conformation indicates similar load patterns exerted in Neanderthals and extant humans by the vastus lateralis, but not by the vastus medialis, with implications on the mediolateral stabilization of the knee joint. However, the patterns of structural variation of the patellar network remain to be assessed in other Neanderthal samples.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24709>

**Current Biology****ARTICLES****JANET MANN – Animal behavior: Killer whale mamas' boys**

Long-term study of killer whales reveals that sons stay with their mothers for life, and although this benefits sons, it negatively impacts the mother's reproductive output.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)00086-6](https://www.cell.com/current-biology/fulltext/S0960-9822(23)00086-6)

**Frontiers in Communication****PAPERS****MAGALI A. MARI & MISHA-LAURA MÜLLER – Social cognition and Relevance: How stereotypes impact the processing of definite and indefinite descriptions**

Institute of Communication and Cognitive Sciences, Cognitive Science Center, University of Neuchâtel, Neuchâtel, Switzerland

This paper focuses on the impact of social cognition on the processing of linguistic information. More specifically, it brings some insights to Relevance theory's construal of MeaningNN, which seeks to account for non-propositional meanings. It shows, through two experiments, how gender and nationality-related stereotypes guide the processing of definite and indefinite descriptions. Experiment 1 consists of a self-paced reading task (with 59 French native speakers), introducing information confirming vs. violating gender stereotypes within a nominal phrase (NP). The NP (e.g., "chirurgien/chirurgienne", "surgeonmale/female") was itself introduced either by a definite article (presupposition) or an indefinite article (assertion). Results showed that information violating gender stereotypes was costlier to process than stereotype-congruent information. Moreover, when information violated gender stereotypes, definite descriptions became significantly costlier than indefinite ones, because they required the identification of a salient referent which contradicted stereotypical expectations. Experiment 2 tested the effects of definite vs. indefinite NP on processing nationality-related stereotypes in a self-paced reading task (with 49 French native speakers). Participants read definite vs. indefinite NPs referring to representatives of a country. The NP was subsequently paired with information that confirmed vs. contradicted nationality stereotypes. Results showed that information contradicting nationality stereotypes were significantly costlier to process than information confirming stereotypes. Furthermore, when information contradicted nationality stereotypes, indefinite descriptions (which promote a single occurrence reading) failed to facilitate information processing compared to definite descriptions (which promote a generalized representation of the social category). Overall, the present findings are consistent with research on stereotypes, in that they show that stereotype-incongruent information affect sentence processing. Importantly, while Experiment 1 revealed that stereotypes affected the processing of linguistic markers, Experiment 2 suggested that linguistic markers could not modulate the processing of stereotypes.

<https://www.frontiersin.org/articles/10.3389/fcomm.2023.1088861/full>

**Frontiers in Psychology****PAPERS****VIDYA GANI WIJAYA et al – Why people hesitate to help: Neural correlates of the counter-dynamics of altruistic helping and individual differences in daily helping tendencies**

Recent psychological and neuroimaging studies on altruism–egoism dilemmas have promoted our understanding of the processes underlying altruistic motivation; however, little attention has been paid to the egoistic counter-dynamics that prompt hesitancy to help. These counter-dynamics may involve the construction of reasons not to help based on contextual

elaboration and explain individual differences in the tendency to help others in daily life. In this functional magnetic resonance imaging (fMRI) study, we explored the neural correlates of altruism–egoism dilemmas during empathy-driven helping decisions, with particular attention to the counter-dynamics related to individual helping tendency traits. We used two context-rich helping decision scenarios. In the empathy dilemma (Emp) scenario, empathy-driven motivation to help a poor person was associated with a cost, whereas in the economic-dilemma (Eco) scenario, self-beneficial motivation to help a non-poor person was associated with a cost. Our results showed activation of the right anterior prefrontal cortices, supramarginal gyrus, and posterior cingulate cortex (PCC) for the altruism–egoism dilemma (i.e., Emp > Eco). A significant negative effect of the helping tendency trait score was observed on PCC activation; interestingly, this effect was observed for both Emp and Eco dilemmas. The identified neural correlates of altruism–egoism dilemmas appear to be related to the construction of decision reasons based on contextual elaboration in naturalistic situations. In contrast to the classical view, our results suggest a two-stage model that includes an altruistic helping decision followed by counter-dynamics to determine the individual helping tendency.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1080376/full>

## iScience

### PAPERS

#### **NOBUAKI MIZUMOTO et al – Functional and mechanistic diversity in ant tandem communication**

Communication is fundamental to the organization of animal societies, often resulting in the convergent evolution of similar social behavior across lineages. However, this similarity may conceal underlying functional and mechanistic differences. Here we combined network and information-theoretic analysis to quantify how tandem recruitment is distinguishable between two ant genera, *Temnothorax* and *Diacamma*. We show that *Temnothorax* uses tandem running to recruit additional recruiters, while *Diacamma* uses it principally to move the passive majority of their colony, a task that *Temnothorax* accomplishes with a different behavior, social carrying. Accordingly, the network structure of *Diacamma* tandems was dissimilar to that of *Temnothorax*, instead resembling the social carrying networks in *Temnothorax*. Furthermore, our information-theoretical analysis on movement trajectories revealed that *Diacamma* tandem runs lack bidirectional information transfer, the signature of route-learning in *Temnothorax*. By quantifying the diversity of similar communication systems, this study increases the resolution of our understanding of animal societies.

[https://www.cell.com/iscience/fulltext/S2589-0042\(23\)00495-9](https://www.cell.com/iscience/fulltext/S2589-0042(23)00495-9)

## Nature

### ARTICLES

#### **ALEXANDER Z. HARRIS & NANCY PADILLA-COREANO – How loss of social status affects the brain**

Dominant mice that are forced to unexpectedly give way to subordinates in a rigged test lose social status and miss opportunities for pleasure. These effects are due to changes in a neuronal circuit that involves the brain's 'anti-reward' centre.

<https://www.nature.com/articles/d41586-023-00602-3>

### COMMENTARIES

#### **NICHOLAS J. MURPHY et al – Common orthopaedic trauma may explain 31,000-year-old remains**

The fascinating discovery of skeletal remains in Borneo of an individual (TB1) with absent left distal tibia, fibula and foot from 31,000 years ago has been proposed as evidence of a contemporaneous sophisticated amputation procedure. Maloney et al. [EAORC Bulletin 1,005 – <https://www.nature.com/articles/s41586-022-05160-8>] infer from the bony abnormalities that surgical amputation is the only possible explanation and, furthermore, that the limb shows no evidence of infection. We dispute the conclusion that these skeletal remains provide evidence of a transosseous surgical amputation and that the limb shows no signs of infection. We propose that the skeletal findings have more plausible alternative explanations, such as the natural history of an injury pattern commonly encountered in blunt orthopaedic trauma, an open distal tibia/fibula fracture with growth-plate involvement.

<https://www.nature.com/articles/s41586-023-05756-8>

#### **MELANDRI VLOK et al with TIM MALONEY – Reply to: Common orthopaedic trauma may explain 31,000-year-old remains**

We appreciate the accompanying technical Comment by Murphy et al.—a group of practicing orthopaedic surgeons—on our original paper. However, we strongly disagree with their conclusion that a reductionist approach was taken in the diagnosis of surgical amputation in a 31,000-year-old individual (TB1) from Borneo. We note that a complete systematic differential diagnosis was indeed completed (Extended Data Table 1); this process involved careful consideration of the most common and banal conditions first, such as accidental fracture, before considering the possibility of more rare and unusual circumstances. Through this iterative process, fracture was first eliminated as a possibility, followed by natural causes of amputation.

<https://www.nature.com/articles/s41586-023-05757-7>

**RETRACTIONS****THE EDITORS – Retraction Note: Site-specific group selection drives locally adapted group compositions (Jonathan N. Pruitt & Charles J. Goodnight)**

The Editors have retracted this article [EAORC Bulletin 592]. Concerns were raised regarding potential anomalies in the census and experimental data on the aggressiveness and docility of the spiders and the experimental data on prey availability. Post-publication review concluded that the data are not reliable. The Editors therefore no longer have confidence in the results and conclusions of this article. Jonathan N. Pruitt disagrees with this retraction. Charles J. Goodnight is deceased.

<https://www.nature.com/articles/s41586-023-05882-3>

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**Nature Communications Biology****PAPERS****HADAS LEAH AVNI et al with JEAN-JACQUES HUBLIN – Evolutionary roots of the risk of hip fracture in humans**

The transition to bipedal locomotion was a fundamental milestone in human evolution. Consequently, the human skeleton underwent substantial morphological adaptations. These adaptations are responsible for many of today's common physical impairments, including hip fractures. This study aims to reveal the morphological changes in the proximal femur, which increase the risk of intracapsular hip fractures in present-day populations. Our sample includes chimpanzees, early hominins, early Homo Neanderthals, as well as prehistoric and recent humans. Using Geometric Morphometric methods, we demonstrate differences in the proximal femur shape between hominids and populations that practiced different lifestyles. We show that the proximal femur morphology is a risk factor for intracapsular hip fracture independent of osteoporosis. Changes in the proximal femur, such as the shortening of the femoral neck and an increased anterolateral expansion of the greater trochanter, are associated with an increased risk for intracapsular hip fractures. We conclude that intracapsular hip fractures are a trade-off for efficient bipedal walking in humans, and their risk is exacerbated by reduced physical activity.

<https://www.nature.com/articles/s42003-023-04633-4>

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**Nature Ecology & Evolution****PAPERS****LUUK A. BROEILS et al – Evolution and implications of de novo genes in humans**

Genes and translated open reading frames (ORFs) that emerged de novo from previously non-coding sequences provide species with opportunities for adaptation. When aberrantly activated, some human-specific de novo genes and ORFs have disease-promoting properties—for instance, driving tumour growth. Thousands of putative de novo coding sequences have been described in humans, but we still do not know what fraction of those ORFs has readily acquired a function. Here, we discuss the challenges and controversies surrounding the detection, mechanisms of origin, annotation, validation and characterization of de novo genes and ORFs. Through manual curation of literature and databases, we provide a thorough table with most de novo genes reported for humans to date. We re-evaluate each locus by tracing the enabling mutations and list proposed disease associations, protein characteristics and supporting evidence for translation and protein detection. This work will support future explorations of de novo genes and ORFs in humans.

<https://www.nature.com/articles/s41559-023-02014-y>

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**Nature Human Behaviour****PAPERS****LOGAN Z. J. WILLIAMS et al – Structural and functional asymmetry of the neonatal cerebral cortex**

Features of brain asymmetry have been implicated in a broad range of cognitive processes; however, their origins are still poorly understood. Here we investigated cortical asymmetries in 442 healthy term-born neonates using structural and functional magnetic resonance images from the Developing Human Connectome Project. Our results demonstrate that the neonatal cortex is markedly asymmetric in both structure and function. Cortical asymmetries observed in the term cohort were contextualized in two ways: by comparing them against cortical asymmetries observed in 103 preterm neonates scanned at term-equivalent age, and by comparing structural asymmetries against those observed in 1,110 healthy young adults from the Human Connectome Project. While associations with preterm birth and biological sex were minimal, significant differences exist between birth and adulthood.

<https://www.nature.com/articles/s41562-023-01542-8>

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## Nature Reviews Genetics

### ARTICLES

#### **LINDA KOCH – Genomic transformations of Eurasian hunter-gatherer populations during the last Ice Age**

A new study analysing 356 ancient hunter-gatherer genomes, covering a period spanning the Upper Palaeolithic to the Late Neolithic (that is, from 35,000 to 5,000 years ago; ka) reports detailed insights into the history and interactions of West Eurasian hunter-gatherer groups and highlights genetic replacements of entire Ice Age populations.

<https://www.nature.com/articles/s41576-023-00593-x>

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## Nature Scientific Reports

### PAPERS

#### **AUDREY VIALATTE et al – Enhancing reading accuracy through visual search training using symbols**

Children with reading disorders present with inaccurate and/or delayed printed word identification. Regarding visual-attentional processing, printed words are letter strings, and each letter is a symbol made of separable features. Simultaneous processing of separable features has been evidenced to be specifically impaired in visual search tasks using symbols in poor readers as well as in a patient with superior parietal lobules (SPL) lesion. Additionally, activation in the SPL has been shown to be abnormally low in dyslexic readers displaying a reduced span of letter strings processing. This deficit has been assumed to impair visual-attentional sampling of printed words. An experiment conducted with 21 dyslexic children tested the hypothesis that a training program based on visual symbol search may stimulate the SPL, leading to a potential benefit transferred to reading performance. We designed the VisioCogLetters serious game and introduced it at random for one month (10 min every day) between four monthly reading sessions. No training was provided between the other (control) reading sessions. Reading accuracy increased without any speed-accuracy trade-off specifically in the session after training. Moreover, the percentage of improvement correlated with the individual time spent at home on training. These results show that improved visual search skills on symbols can translate into enhanced reading performance, and pave a new avenue for future rehabilitation tools.

<https://www.nature.com/articles/s41598-023-31037-5>

#### **AGNIESZKA PLUTA et al – Exposure to hate speech deteriorates neurocognitive mechanisms of the ability to understand others' pain**

The widespread ubiquity of hate speech affects people's attitudes and behavior. Exposure to hate speech can lead to prejudice, dehumanization, and lack of empathy towards members of outgroups. However, the impact of exposure to hate speech on empathy and propensity to attribute mental states to others has never been directly tested empirically. In this fMRI study, we examine the effects of exposure to hate speech on neural mechanisms of empathy towards ingroup (Poles) versus outgroup members (Arabs). Thirty healthy young adults were randomly assigned to 2 groups: hateful and neutral. During the fMRI study, they were initially exposed to hateful or neutral comments and subsequently to narratives depicting Poles and Arabs in pain. Using whole-brain and region of interest analysis, we showed that exposure to derogatory language about migrants attenuates the brain response to someone else's pain in the right temporal parietal junction (rTPJ), irrespective of group membership (Poles or Arabs). Given that rTPJ is associated with processes relevant to perspective-taking, its reduced activity might be related to a decreased propensity to take the psychological perspective of others. This finding suggests that hate speech affects human functioning beyond intergroup relations.

<https://www.nature.com/articles/s41598-023-31146-1>

#### **RONALD HÜBNER et al – Evidence that the aesthetic preference for Hogarth's Line of Beauty is an evolutionary by-product**

In 1753, artist William Hogarth declared a specific S-shaped line to be the 'Line of Beauty' (LoB). Hogarth's assertion has had a profound impact on diverse fields over the past two and a half centuries. However, only one recent (2022) study has investigated whether Hogarth's assertion accurately captures humans' actual aesthetic preferences, and no research has explored why people find the LoB beautiful. We conducted two studies testing the hypothesis that the LoB's perceived beauty is an incidental by-product of cognitive systems that evolved to attend to fitness-relevant morphological features in people. In Study 1, we replicated the finding that female bodies whose lumbar curvature approximates the biomechanical optimum for dealing with the exigencies of pregnancy are rated as more attractive. In Study 2, we found that abstract lines extracted from these bodies were perceived as more beautiful than other lines. These results suggest that the preference for Hogarth's LoB is an incidental by-product of psychological mechanisms that evolved for other purposes. More broadly, these findings suggest that an evolutionary psychological approach – in particular the concept of evolutionary by-product – may be useful for understanding, explaining, and predicting people's aesthetic preferences for certain abstract symbols, which otherwise might seem arbitrary and inexplicable.

<https://www.nature.com/articles/s41598-023-31175-w>



**PETER M. YAWORSKY, SHUMON T. HUSSAIN & FELIX RIEDE – Climate-driven habitat shifts of high-ranked prey species structure Late Upper Paleolithic hunting**

Changing climates in the past affected both human and faunal population distributions, thereby structuring human diets, demography, and cultural evolution. Yet, separating the effects of climate-driven and human-induced changes in prey species abundances remains challenging, particularly during the Late Upper Paleolithic, a period marked by rapid climate change and marked ecosystem transformation. To disentangle the effects of climate and hunter-gatherer populations on animal prey species during the period, we synthesize disparate paleoclimate records, zooarchaeological data, and archaeological data using ecological methods and theory to test to what extent climate and anthropogenic impacts drove broad changes in human subsistence observed in the Late Upper Paleolithic zooarchaeological records. We find that the observed changes in faunal assemblages during the European Late Upper Paleolithic are consistent with climate-driven animal habitat shifts impacting the natural abundances of high-ranked prey species on the landscape rather than human-induced resource depression. The study has important implications for understanding how past climate change impacted and structured the diet and demography of human populations and can serve as a baseline for considerations of resilience and adaptation in the present.

<https://www.nature.com/articles/s41598-023-31085-x>

**FRANCESCO NAVA et al – Age-dependent changes in intuitive and deliberative cooperation**

Cooperation is one of the most advantageous strategies to have evolved in small- and large-scale human societies, often considered essential to their success or survival. We investigated how cooperation and the mechanisms influencing it change across the lifespan, by assessing cooperative choices from adolescence to old age (12–79 years, N = 382) forcing participants to decide either intuitively or deliberately through the use of randomised time constraints. As determinants of these choices, we considered participants' level of altruism, their reciprocity expectations, their optimism, their desire to be socially accepted, and their attitude toward risk. We found that intuitive decision-making favours cooperation, but only from age 20 when a shift occurs: whereas in young adults, intuition favours cooperation, in adolescents it is reflection that favours cooperation. Participants' decisions were shown to be rooted in their expectations about other people's cooperative behaviour and influenced by individuals' level of optimism about their own future, revealing that the journey to the cooperative humans we become is shaped by reciprocity expectations and individual predispositions.

<https://www.nature.com/articles/s41598-023-31691-9>

**QINGKE GUO et al – Mindfulness may be associated with less prosocial engagement among high intelligence individuals**

This study examined the role of dispositional mindfulness in the association between intelligence and prosocial behavior. A total of 759 college students (mean age is 22.03; 477 females) participated in exchange for extra credit in psychology course. The results confirmed a positive relationship between intelligence and prosocial behavior as revealed by many studies, with empathy serving as a potential mediator. Mindfulness negatively moderated all the hypothesized pathways between research variables. Specifically, with the increase of the levels of dispositional mindfulness, (1) the intelligence-prosociality association changed from positive to negative, (2) the intelligence-empathy association changed from positively significant to insignificant, (3) the empathy-prosociality association changed from stronger to weaker. These findings may suggest some limitations of mindfulness. That is, present moment awareness and acceptance of the status quo may result in reduced arousal when witnessing others suffering, thereby preventing high intelligence individuals from helping the sufferers to get rid of trouble.

<https://www.nature.com/articles/s41598-023-31039-3>

**Neuron****PAPERS****ABHILASH DWARAKANATH et al – Bistability of prefrontal states gates access to consciousness**

Access of sensory information to consciousness has been linked to the ignition of content-specific representations in association cortices. How does ignition interact with intrinsic cortical state fluctuations to give rise to conscious perception? We addressed this question in the prefrontal cortex (PFC) by combining multi-electrode recordings with a binocular rivalry (BR) paradigm inducing spontaneously driven changes in the content of consciousness, inferred from the reflexive optokinetic nystagmus (OKN) pattern. We find that fluctuations between low-frequency (LF, 1–9 Hz) and beta (~20–40 Hz) local field potentials (LFPs) reflect competition between spontaneous updates and stability of conscious contents, respectively. Both LF and beta events were locally modulated. The phase of the former locked differentially to the competing populations just before a spontaneous transition while the latter synchronized the neuronal ensemble coding the consciously perceived content. These results suggest that prefrontal state fluctuations gate conscious perception by mediating internal states that facilitate perceptual update and stability.

[https://www.cell.com/neuron/fulltext/S0896-6273\(23\)00131-9](https://www.cell.com/neuron/fulltext/S0896-6273(23)00131-9)

**New Scientist****NEWS****Stone flakes made by monkeys cast doubt on ancient human 'tools'**

When macaques use stones to crack nuts, they accidentally create flakes that look like early human artefacts, raising questions about whether such objects were made deliberately.

<https://www.newscientist.com/article/2363882-stone-flakes-made-by-monkeys-cast-doubt-on-ancient-human-tools/>

**Bumblebees can teach each other how to open a puzzle box**

When researchers taught a bumblebee to push a lever for a reward, the knowledge spread through its colony, hinting that these insects have a kind of minimal culture.

<https://www.newscientist.com/article/2363354-bumblebees-can-teach-each-other-how-to-open-a-puzzle-box/>

**Cave paintings of mutilated hands could be a Stone Age sign language**

Palaeolithic hand stencils with missing fingers could indicate ritual mutilation or frostbite – but new research suggests they might be trying to tell us something.

<https://www.newscientist.com/article/mg25734300-900-cave-paintings-of-mutilated-hands-could-be-a-stone-age-sign-language/>

**ARTICLES****ALISON GEORGE – Cave paintings of mutilated hands could be a Stone Age sign language**

Palaeolithic hand stencils with missing fingers could indicate ritual mutilation or frostbite – but new research suggests they might be trying to tell us something.

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**PLoS Biology****PAPERS****MARCO K. WITTMANN et al – Local and global reward learning in the lateral frontal cortex show differential development during human adolescence**

*This is an uncorrected proof.*

Reward-guided choice is fundamental for adaptive behaviour and depends on several component processes supported by prefrontal cortex. Here, across three studies, we show that two such component processes, linking reward to specific choices and estimating the global reward state, develop during human adolescence and are linked to the lateral portions of the prefrontal cortex. These processes reflect the assignment of rewards contingently to local choices, or noncontingently, to choices that make up the global reward history. Using matched experimental tasks and analysis platforms, we show the influence of both mechanisms increase during adolescence (study 1) and that lesions to lateral frontal cortex (that included and/or disconnected both orbitofrontal and insula cortex) in human adult patients (study 2) and macaque monkeys (study 3) impair both local and global reward learning. Developmental effects were distinguishable from the influence of a decision bias on choice behaviour, known to depend on medial prefrontal cortex. Differences in local and global assignments of reward to choices across adolescence, in the context of delayed grey matter maturation of the lateral orbitofrontal and anterior insula cortex, may underlie changes in adaptive behaviour.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002010>

**ALICE D. BRIDGES et al with LARS CHITTKA – Bumblebees acquire alternative puzzle-box solutions via social learning**

The astonishing behavioural repertoires of social insects have been thought largely innate, but these insects have repeatedly demonstrated remarkable capacities for both individual and social learning. Using the bumblebee *Bombus terrestris* as a model, we developed a two-option puzzle box task and used open diffusion paradigms to observe the transmission of novel, nonnatural foraging behaviours through populations. Box-opening behaviour spread through colonies seeded with a demonstrator trained to perform 1 of the 2 possible behavioural variants, and the observers acquired the demonstrated variant. This preference persisted among observers even when the alternative technique was discovered. In control diffusion experiments that lacked a demonstrator, some bees spontaneously opened the puzzle boxes but were significantly less proficient than those that learned in the presence of a demonstrator. This suggested that social learning was crucial to proper acquisition of box opening. Additional open diffusion experiments where 2 behavioural variants were initially present in similar proportions ended with a single variant becoming dominant, due to stochastic processes. We discuss whether these results, which replicate those found in primates and birds, might indicate a capacity for culture in bumblebees.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002019>

**PLoS One****PAPERS****A. BURKE et al – The archaeological potential of the northern Luangwa Valley, Zambia: The Luwumbu basin**

The Luangwa Basin, Zambia, which forms part of the Zambezi drainage, is strategically located between the Central African plateau and the East African Rift system. The Luangwa River and major tributaries, such as the Luwumbu River, are perennial water sources supporting essential resources that sustain human communities and a rich and diverse fauna and flora. The archaeological record of Luangwa is relatively unknown, despite early archaeological exploration hinting at its potential. Recent research in the southern Luangwa valley, however, suggests that it preserves a long record of hominin occupation spanning the Early to Late Stone Age. The research described here details fieldwork carried out in northeastern Luangwa, in the Luwumbu Basin, that confirms that a relatively deep package of Quaternary deposits, containing evidence of the Stone Age occupation of the region persists in the upper piedmont zone.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0269209>

**MELISSA KENNEDY et al – Cult, herding, and ‘pilgrimage’ in the Late Neolithic of north-west Arabia: Excavations at a mustatil east of AIUla**

Since the 1970s, monumental stone structures now called mustatil have been documented across Saudi Arabia. However, it was not until 2017 that the first intensive and systematic study of this structure type was undertaken, although this study could not determine the precise function of these features. Recent excavations in AIUla have now determined that these structures fulfilled a ritual purpose, with specifically selected elements of both wild and domestic taxa deposited around a betyl. This paper outlines the results of the University of Western Australia’s work at site IDIHA-0008222, a 140 m long mustatil (IDIHA-F-0011081), located 55 km east of AIUla. Work at this site sheds new and important light on the cult, herding and ‘pilgrimage’ in the Late Neolithic of north-west Arabia, with the site revealing one of the earliest chronometrically dated betyls in the Arabian Peninsula and some of the earliest evidence for domestic cattle in northern Arabia.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0281904>

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**Trends in Cognitive Sciences****PAPERS****JAMES DANCKERT & ANDREAS ELPIDOROU – In search of boredom: beyond a functional account**

Boredom has been characterized as a crisis of meaning, a failure of attention, and a call to action. Yet as a self-regulatory signal writ-large, we are still left with the question of what makes any given boredom episode meaningless, disengaging, or a prompt to act. We propose that boredom is an affective signal that we have deviated from an optimal (‘Goldilocks’) zone of cognitive engagement. Such deviations may be due to a perceived lack of meaning, arise as a consequence of struggles we are experiencing in attending to a task, or be interpreted as a blunt call to find something different to engage with. Thus, the key to understanding boredom lies in its role in keeping us cognitively engaged.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00046-3](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00046-3)

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