

## EAORC BULLETIN 1,070 – 17 December 2023

## CONTENTS

<b>NOTICES</b> .....	<b>3</b>
PUBLICATION ALERTS.....	3
EDITORIAL INTERJECTIONS.....	3
ACADEMIA.EDU – Becoming Human: the Archaeological Challenge.....	3
COLIN RENFREW – Becoming Human: the Archaeological Challenge.....	3
ACADEMIA.EDU – 4E cognition in the Lower Palaeolithic.....	3
THOMAS WYNN, KARENLEIGH A. OVERMANN & LAMBROS MALAFOURIS – 4E cognition in the Lower Palaeolithic.....	3
FUNDING ALERT – The Percy Sladen Memorial Fund.....	3
<b>NEWS</b> .....	<b>4</b>
NATURE BRIEFING – Record number of papers retracted in 2023.....	4
NATURE BRIEFING – The true otherness of Neanderthals.....	4
SCIENCEADVISER – On honey hunts, birds and people flock together.....	4
SCIENCEADVISER – The cost of a complex brain.....	4
SCIENCEADVISER – Left nothing but footprints.....	4
THE CONVERSATION – Human intelligence: how cognitive circuitry, rather than brain size, drove its evolution.....	4
<b>PUBLICATIONS</b> .....	<b>5</b>
American Journal of Biological Anthropology.....	5
<b>PAPERS</b> .....	5
THOMAS C. PRANG – The relative size of the calcaneal tuber reflects heel strike plantigrady in African apes and humans.....	5
Biolinguistics.....	5
<b>PAPERS</b> .....	5
RONI KATZIR – Why Large Language Models Are Poor Theories of Human Linguistic Cognition: A Reply to Piantadosi.....	5
Cell.....	5
<b>PAPERS</b> .....	5
YANXIN LI et al – Spatiotemporal transcriptome atlas reveals the regional specification of the developing human brain.....	5
Current Biology.....	5
<b>PAPERS</b> .....	5
ROBERTA P. CALCE et al – Voice categorization in the four-month-old human brain.....	5
eLife.....	6
<b>PAPERS</b> .....	6
PAUL A. G. FORBES et al – Acute stress reduces effortful prosocial behaviour.....	6
Evolutionary Anthropology.....	6
<b>PAPERS</b> .....	6
ADRIAN VILIAMI BELL – Selection and adaptation in human migration.....	6
ALEX BERTACCHI & DAVID P. WATTS – The use of chimpanzee-modified faunal assemblages to investigate early hominin carnivory.....	6
TEGAN I. F. FOISTER et al – Homo heterogenus: Variability in early Pleistocene Homo environments.....	6
<b>REVIEWS</b> .....	7
SCOTT A. WILLIAMS – The wrong ape for early human origins: A skewed view.....	7
Frontiers in Bioinformatics.....	7
<b>PAPERS</b> .....	7
JACK M. CRAIG et al – Completing a molecular timetree of apes and monkeys.....	7
Frontiers in Psychology.....	7
<b>PAPERS</b> .....	7
LAURA MATHILDE PABST & MARLENE KOLLMAYER – How to make a difference: the impact of gender-fair language on text comprehensibility amongst adults with and without an academic background.....	7
iScience.....	7
<b>PAPERS</b> .....	7
ELENA NAVA, MICHELLE GIRAUD & NADIA BOLOGNINI – The emergence of the multisensory brain: from the womb to the first steps.....	7
Nature.....	8
<b>NEWS</b> .....	8
How our brains decode speech: special neurons process certain sounds.....	8

'Biocomputer' combines lab-grown brain tissue with electronic hardware.....	8
<b>PAPERS.....</b>	<b>8</b>
MATTHEW K. LEONARD et al – Large-scale single-neuron speech sound encoding across the depth of human cortex.....	8
MATTHEW SILCOCKS et al with THE NATIONAL CENTRE FOR INDIGENOUS GENOMICS – Indigenous Australian genomes show deep structure and rich novel variation.....	8
ANDRE L. M. REIS et al with THE NATIONAL CENTRE FOR INDIGENOUS GENOMICS – The landscape of genomic structural variation in Indigenous Australians.....	8
<b>REVIEWS.....</b>	<b>9</b>
REBECCA WRAGG SYKES – Were Neanderthals soulful inventors or strange cannibals?.....	9
Nature Communications.....	9
<b>PAPERS.....</b>	<b>9</b>
FRANCESCO CECCARELLI et al – Static and dynamic coding in distinct cell types during associative learning in the prefrontal cortex.....	9
Nature India.....	9
<b>NEWS.....</b>	<b>9</b>
Unique unchanged DNA stretches define humans and other primates.....	9
Nature Scientific Reports.....	9
<b>PAPERS.....</b>	<b>9</b>
CRISTINA-IOANA GALUSCA et al – Toddlers' sensitivity to dominance traits from faces.....	9
INA REICHE et al – First discovery of charcoal-based prehistoric cave art in Dordogne.....	9
SHANY DROR et al – A citizen science model turns anecdotes into evidence by revealing similar characteristics among Gifted Word Learner dogs.....	10
GEMA MARTIN-ORDAS – Relational reasoning in wild bumblebees revisited: the role of distance.....	10
JANEK S. LOBMAIER & DARIA KNOCH – Face coverings increase apparent honesty and cooperativeness.....	10
L. G. VAN DER SLUIS et al – Identification and tentative removal of collagen glue in Palaeolithic worked bone objects: implications for ZooMS and radiocarbon dating.....	10
NAHYEON LEE et al – Social dilemma in foraging behavior and evolution of cooperation by learning.....	11
Neuron.....	11
<b>PAPERS.....</b>	<b>11</b>
TAE-YONG CHOI et al – Distinct prefrontal projection activity and transcriptional state conversely orchestrate social competition and hierarchy.....	11
New Scientist.....	11
<b>NEWS.....</b>	<b>11</b>
Gesturing as you talk may help you speak a new language like a local.....	11
Honeyguide birds respond to special calls from human honey-hunters.....	11
Philosophical Transactions of the Royal Society B.....	11
<b>PAPERS.....</b>	<b>11</b>
PETER J. RICHERSON, ROBERT T. BOYD & CHARLES EFFERSON – Agentic processes in cultural evolution: relevance to Anthropocene sustainability.....	11
PLoS One.....	12
<b>PAPERS.....</b>	<b>12</b>
ANDUS WING-KUEN WONG et al – Tonal and syllabic encoding in overt Cantonese Chinese speech production: An ERP study.....	12
JÜLIDE KUBAT et al – Geometric morphometrics and paleoproteomics enlighten the paleodiversity of Pongo.....	12
KASUN VITHANAGE et al – Accelerating language emergence by functional pressures.....	12
JOHN M. MCBRIDE, SAM PASSMORE & TSVI TLUSTY – Convergent evolution in a large cross-cultural database of musical scales.....	13
HENI YUWONO et al – Do psychological capital and transformational leadership make differences in organizational citizenship behavior?.....	13
MAGDALENA BLANZ et al – Early Neolithic pastoral land use at Alsónyék-Bátaszék, Hungary (Starčevo culture): New insights from stable isotope ratios.....	13
Proceedings of the Royal Society B.....	14
<b>PAPERS.....</b>	<b>14</b>
JULY A. PILOWSKY et al – Millennial processes of population decline, range contraction and near extinction of the European bison.....	14
Royal Society Open Science.....	14
<b>PAPERS.....</b>	<b>14</b>
RUTH E. CORPS, FANG YANG & MARTIN J. PICKERING – Evidence against egocentric prediction during language comprehension.....	14
Science.....	14
<b>REVIEWS.....</b>	<b>14</b>
JOHN ROBB – Object lessons.....	14
Science Advances.....	14
<b>PAPERS.....</b>	<b>14</b>
GABRIEL CASTRILLON et al – An energy costly architecture of neuromodulators for human brain evolution and cognition.....	14
Trends in Cognitive Sciences.....	15
<b>PAPERS.....</b>	<b>15</b>

ONUR GÜNTÜRKÜN, ROLAND PUSCH & JONAS ROSE – Why birds are smart.....	15
Trends in Ecology and Evolution.....	15
PAPERS.....	15
WAYNE WU – We know what attention is!.....	15
<b>SUBSCRIBE to the EAORC Bulletin .....</b>	<b>15</b>
<b>UNSUBSCRIBE from the EAORC Bulletin .....</b>	<b>15</b>
<b>PRODUCED BY AND FOR THE EAORC EMAIL GROUP.....</b>	<b>15</b>

---

## 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.

---

### EDITORIAL INTERJECTIONS

Comments in curly brackets are editorial interjections. The Editor reserves the right to be wrong.

---

### ACADEMIA.EDU – Becoming Human: the Archaeological Challenge

*Proceedings of the British Academy 139, 217-238 (2006).*

#### **COLIN RENFREW – Becoming Human: the Archaeological Challenge**

It might seem presumptuous, in delivering the British Academy lecture, to consider the human condition, a theme which has preoccupied the greatest philosophers. Yet while archaeologists can claim no special or exclusive insights into human nature, we can claim to offer information about the processes and events which have made us what we are. Here I want to speak of two related challenges arising from this theme: the challenge of archaeology, and the challenge for archaeology.

[https://www.academia.edu/110805238/Becoming\\_Human\\_the\\_Archaeological\\_Challenge](https://www.academia.edu/110805238/Becoming_Human_the_Archaeological_Challenge)

---

### ACADEMIA.EDU – 4E cognition in the Lower Palaeolithic

*Adaptive Behavior 29:2, 99-106 (2021).*

#### **THOMAS WYNN, KARENLEIGH A. OVERMANN & LAMBROS MALAFOURIS – 4E cognition in the Lower Palaeolithic**

This essay introduces a special issue focused on 4E cognition (cognition as embodied, embedded, enactive, and extended) in the Lower Palaeolithic. In it, we review the typological and representational cognitive approaches that have dominated the past 50 years of paleoanthropology. These have assumed that all representations and computations take place only inside the head, which implies that the archaeological record can only be an “external” product or the behavioral trace of “internal” representational and computational processes. In comparison, the 4E approach helps us to overcome this dualist representational logic, allowing us to engage directly with the archaeological record as an integral part of the thinking process, and thus ground a more parsimonious cognitive archaeology. It also treats stone tools, the primary vestiges of hominin thinking, as active participants in mental life. The 4E approach offers a better grounding for understanding hominin technical expertise, a crucially important component of hominin cognitive evolution.

[https://www.academia.edu/67448258/4E\\_cognition\\_in\\_the\\_Lower\\_Palaeolithic](https://www.academia.edu/67448258/4E_cognition_in_the_Lower_Palaeolithic)

---

### FUNDING ALERT – The Percy Sladen Memorial Fund

The Percy Sladen Memorial Fund is a charity associated with the Linnean Society of London that offers small travel & subsistence grants (up to £2000) for fieldwork in Natural History (anthropology, archaeology, botany, geology, palaeontology and zoology). There are two application deadlines per year: 30th January and 30th September. Prospective applicants should email the fund’s secretary, Elizabeth Rollinson, erollinson13@gmail.com for an application form in good time before a deadline. With regret, the fund does not support conference attendance, visits to institutions, training or student studies that are part of student projects (undergrad, masters or PhD). Further information can be found here:

<https://www.linnean.org/the-society/medals-awards-prizes-grants/percy-sladen-memorial-fund-grants>

Prof JM Pemberton

Institute of Ecology and Evolution

School of Biological Sciences

University of Edinburgh

EH9 3FL

0131 650 5505

---

## NEWS

### NATURE BRIEFING – Record number of papers retracted in 2023

The number of retractions issued for research articles this year has passed 10,000 as publishers struggle to clean up a slew of sham papers and peer-review fraud. Among large research-producing nations, Saudi Arabia, Pakistan, Russia and China have the highest retraction rates over the past two decades. The bulk of this year's retractions were from journals owned by the publisher Hindawi. These journals have pulled more than 8,000 articles this year.

<https://www.nature.com/articles/d41586-023-03974-8>

---

### NATURE BRIEFING – The true otherness of Neanderthals

In his new book, archaeologist Ludovic Slimak delves into the 'soul' of Neanderthals — the evidence for their artistic, ritual and symbolic natures. He questions whether others have gone too far in characterizing Homo neanderthalensis as the intellectual and creative cousins of Homo sapiens. And he casts doubt on fellow scientists who don't have the perspective gained from doing decades of fieldwork, which he views as essential. The result is a book that is "absorbing, elegantly written and sometimes mischievously humorous, yet in places also frustratingly unbalanced", writes archaeologist Rebecca Wragg Sykes.

<https://www.nature.com/articles/d41586-023-03862-1>

---

### SCIENCEADVISER – On honey hunts, birds and people flock together

In Mozambique, Tanzania, and other places throughout the African continent, people have an unusual relationship with a small brown-and-white bird. It's appropriately named the honeyguide, because it guides locals to trees containing bees' nests. People hack open the tree trunk to get at the honey, while the birds, in exchange, munch on bee larvae and beeswax. Years ago, scientists demonstrated that people could call upon the birds using a variety of whistles and other sounds. Now, in a Science paper, researchers reveal that the birds prefer to respond to calls made by people local to their own regions: In Tanzania, when researchers called upon birds by playing the local Hadza group's traditional whistling calls, they were far more likely to attract a honeyguide ally than when playing recordings of the Mozambique Yao people's "brrrr-huh" honeyguide call. In Mozambique, the opposite was true.

<https://www.science.org/content/article/birds-lead-people-honey-recognize-local-calls-their-human-helpers>

---

### SCIENCEADVISER – The cost of a complex brain

The human brain is a voracious organ. Despite only weighing about three pounds, it consumes a whopping 20% of the body's metabolic energy, or around 500 calories per day—a much larger portion than the brain of any other species. Now, a new study in Science Advances reveals that some parts of the brain are hungrier than others—a fact that could shed light on how our species came to be so smart.

Using scans from 30 people, researchers analyzed the distribution of energy usage across brain regions. They found that the frontoparietal network, a collection of brain structures that has expanded the most throughout human evolution and plays a major role in memory and decision-making, has a higher energy cost than networks responsible for movement and sensation. Slow-acting circuits regulated by neurotransmitters like dopamine and serotonin also demand a lot of energy.

Scientists have long hypothesized that increased brain size is what allowed humans to develop extraordinary cognitive abilities. But some mammals have larger brains, higher brain-to-body-mass ratios, and more neurons than we do, casting doubt on this idea. These new findings provide a different perspective, supporting the idea that it wasn't just growth in size overall but rather the expansion of specific networks that contributed to the evolution of human smarts.

<https://www.science.org/doi/10.1126/sciadv.adi7632>

---

### SCIENCEADVISER – Left nothing but footprints

Many were incredulous when a 2021 Science study claimed that human footprints in New Mexico were between 21,000 and 23,000 years old—some 5000 years before people supposedly arrived in the Americas. This year, additional evidence firmed up those dates, and while there's more that could be done to set them in stone, the findings are pushing some researchers to reconsider their assumptions about how people first came to the Americas.

<https://www.science.org/doi/10.1126/science.adh5007>

---

### THE CONVERSATION – Human intelligence: how cognitive circuitry, rather than brain size, drove its evolution

The human brain uses up 20% of the energy we consume.

<https://theconversation.com/human-intelligence-how-cognitive-circuitry-rather-than-brain-size-drove-its-evolution-219669>

---

## PUBLICATIONS

### American Journal of Biological Anthropology

#### PAPERS

#### **THOMAS C. PRANG – The relative size of the calcaneal tuber reflects heel strike plantigrady in African apes and humans**

The positional repertoire of the human-chimpanzee last common ancestor is critical for reconstructing the evolution of bipedalism. African apes and humans share a heel strike plantigrade foot posture associated with terrestriality. Previous research has established that modern humans have a relatively large and intrinsically robust calcaneal tuber equipped to withstand heel strike forces associated with bipedal walking and running. However, it is unclear whether African apes have a relatively larger calcaneal tuber than non-heel-striking primates, and how this trait might have evolved among anthropoids. Here, I test the hypothesis that heel-striking primates have a relatively larger calcaneal tuber than non-heel-striking primates. The comparative sample includes 331 individuals and 53 taxa representing hominoids, cercopithecoids, and platyrrhines. Evolutionary modeling was used to test for the effect of foot posture on the relative size of the calcaneal tuber in a phylogenetic framework that accounts for adaptation and inertia. Bayesian evolutionary modeling was used to identify selective regime shifts in the relative size of the calcaneal tuber among anthropoids.

The best fitting evolutionary model was a Brownian motion model with regime-dependent trends characterized by relatively large calcaneal tubers among African apes and humans. Evolutionary modeling provided support for an evolutionary shift toward a larger calcaneal tuber at the base of the African ape and human clade.

The results of this study support the view that African apes and humans share derived traits related to heel strike plantigrady, which implies that humans evolved from a semi-terrestrial quadrupedal ancestor.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24865>

---

### Biolinguistics

#### PAPERS

#### **RONI KATZIR – Why Large Language Models Are Poor Theories of Human Linguistic Cognition: A Reply to Piantadosi**

In a recent manuscript entitled “Modern language models refute Chomsky’s approach to language”, Steven Piantadosi proposes that large language models such as GPT-3 can serve as serious theories of human linguistic cognition. In fact, he maintains that these models are significantly better linguistic theories than proposals emerging from within generative linguistics. The present note explains why this claim is wrong.

<https://bioling.psychopen.eu/index.php/bioling/article/view/13153>

See preprint of Piantadosi’s paper at: <https://ling.auf.net/lingbuzz/007180>

---

### Cell

#### PAPERS

#### **YANXIN LI et al – Spatiotemporal transcriptome atlas reveals the regional specification of the developing human brain**

Different functional regions of brain are fundamental for basic neurophysiological activities. However, the regional specification remains largely unexplored during human brain development. Here, by combining spatial transcriptomics (scStereo-seq) and scRNA-seq, we built a spatiotemporal developmental atlas of multiple human brain regions from 6–23 gestational weeks (GWs). We discovered that, around GW8, radial glia (RG) cells have displayed regional heterogeneity and specific spatial distribution. Interestingly, we found that the regional heterogeneity of RG subtypes contributed to the subsequent neuronal specification. Specifically, two diencephalon-specific subtypes gave rise to glutamatergic and GABAergic neurons, whereas subtypes in ventral midbrain were associated with the dopaminergic neurons. Similar GABAergic neuronal subtypes were shared between neocortex and diencephalon. Additionally, we revealed that cell-cell interactions between oligodendrocyte precursor cells and GABAergic neurons influenced and promoted neuronal development coupled with regional specification. Altogether, this study provides comprehensive insights into the regional specification in the developing human brain.

[https://www.cell.com/cell/fulltext/S0092-8674\(23\)01233-3](https://www.cell.com/cell/fulltext/S0092-8674(23)01233-3)

---

### Current Biology

#### PAPERS

#### **ROBERTA P. CALCE et al – Voice categorization in the four-month-old human brain**

Voices are the most relevant social sounds for humans and therefore have crucial adaptive value in development.

Neuroimaging studies in adults have demonstrated the existence of regions in the superior temporal sulcus that respond preferentially to voices. Yet, whether voices represent a functionally specific category in the young infant’s mind is largely unknown. We developed a highly sensitive paradigm relying on fast periodic auditory stimulation (FPAS) combined with scalp electroencephalography (EEG) to demonstrate that the infant brain implements a reliable preferential response to voices early in life. Twenty-three 4-month-old infants listened to sequences containing non-vocal sounds from different categories presented at 3.33 Hz, with highly heterogeneous vocal sounds appearing every third stimulus (1.11 Hz). We were able to

---

isolate a voice-selective response over temporal regions, and individual voice-selective responses were found in most infants within only a few minutes of stimulation. This selective response was significantly reduced for the same frequency-scrambled sounds, indicating that voice selectivity is not simply driven by the envelope and the spectral content of the sounds. Such a robust selective response to voices as early as 4 months of age suggests that the infant brain is endowed with the ability to rapidly develop a functional selectivity to this socially relevant category of sounds.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)01592-0](https://www.cell.com/current-biology/fulltext/S0960-9822(23)01592-0)

## eLife

### PAPERS

#### **PAUL A. G. FORBES et al – Acute stress reduces effortful prosocial behaviour**

Acute stress can change our cognition and emotions, but what specific consequences this has for human prosocial behaviour is unclear. Previous studies have mainly investigated prosociality with financial transfers in economic games and produced conflicting results. Yet a core feature of many types of prosocial behaviour is that they are effortful. We therefore examined how acute stress changes our willingness to exert effort that benefits others. Healthy male participants - half of whom were put under acute stress - made decisions whether to exert physical effort to gain money for themselves or another person. With this design, we could independently assess the effects of acute stress on prosocial, compared to self-benefitting, effortful behaviour. Compared to controls (n=45), participants in the stress group (n=46) chose to exert effort more often for self- than for other- benefitting rewards at a low level of effort. Additionally, the adverse effects of stress on prosocial effort were particularly pronounced in more selfish participants. Neuroimaging combined with computational modelling revealed a putative neural mechanism underlying these effects: more stressed participants showed increased activation to subjective value in the dorsal anterior cingulate cortex and anterior insula when they themselves could benefit from their exerted effort relative to when someone else could. By using an effort-based task that better approximates real-life prosocial behaviour and incorporating trait differences in prosocial tendencies, our study provides important insights into how acute stress affects prosociality and its associated neural mechanisms.

<https://elifesciences.org/reviewed-preprints/87271>

## Evolutionary Anthropology

### PAPERS

#### **ADRIAN VILIAMI BELL – Selection and adaptation in human migration**

This article reviews the ways migration shapes human biology. This includes the physiological and genetic, but also socio-cultural aspects such as organization, behavior, and culture. Across disciplines I highlight the multiple levels of cultural and genetic selection whereby individuals and groups adapt to pressures along a migration timeline: the origin, transit, and destination. Generally, the evidence suggests that selective pressures and adaptations occur at the individual, family, and community levels. Consequently, across levels there are negotiations, interactions, and feedbacks that shape migration outcomes and the trajectory of evolutionary change. The rise and persistence of migration-relevant adaptations emerges as a central question, including the maintenance of cumulative culture adaptations, the persistence of “cultures of migration,” as well as the individual-level physiological and cognitive adaptations applied to successful transit and settlement in novel environments.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.22003>

#### **ALEX BERTACCHI & DAVID P. WATTS – The use of chimpanzee-modified faunal assemblages to investigate early hominin carnivory**

Chimpanzees regularly hunt and consume prey smaller than themselves. It seems therefore likely that early hominins also consumed small vertebrate meat before they started using and producing stone tools. Research has focused on cut marks and large ungulates, but there is a small body of work that has investigated the range of bone modifications produced on small prey by chimpanzee mastication that, by analogy, can be used to identify carnivory in pre-stone tool hominins. Here, we review these works along with behavioral observations and other neo-taphonomic research. Despite some equifinality with bone modifications produced by baboons and the fact that prey species used in experiments seldom are similar to the natural prey of chimpanzees, we suggest that traces of chimpanzee mastication are sufficiently distinct from those of other predators that they can be used to investigate mastication of vertebrate prey by early hominins.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.22006>

#### **TEGAN I. F. FOISTER et al – Homo heterogenus: Variability in early Pleistocene Homo environments**

To understand the ecological dominance of *Homo sapiens*, we need to investigate the origins of the plasticity that has enabled our colonization of the planet. We can approach this by exploring the variability of habitats to which different hominin populations have adapted over time. In this article, we draw upon and synthesize the current research on habitats of genus *Homo* during the early Pleistocene. We examined 121 published environmental reconstructions from 74 early Pleistocene sites or site phases to assess the balance of arguments in the research community. We found that, while grasslands and savannahs were prominent features of *Homo* habitats in the early Pleistocene, current research does not



place early Pleistocene Homo, in any single environmental type, but in a wide variety of environments, ranging from open grasslands to forests. Our analysis also suggests that the first known dispersal of Homo out of Africa was accompanied by niche expansion.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.22005>

## REVIEWS

### SCOTT A. WILLIAMS – The wrong ape for early human origins: A skewed view

Review of 'The wrong ape for early human origins: The chimpanzee as a skewed ancestral model' by M. Kay Martin, Lexington Books (2023).

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.22007>

---

## Frontiers in Bioinformatics

### PAPERS

#### JACK M. CRAIG et al – Completing a molecular timetree of apes and monkeys

The primate infraorder Simiiformes, comprising Old and New World monkeys and apes, includes the most well-studied species on earth. Their most comprehensive molecular timetree, assembled from thousands of published studies, is found in the TimeTree database and contains 268 simiiform species. It is, however, missing 38 out of 306 named species in the NCBI taxonomy for which at least one molecular sequence exists in the NCBI GenBank. We developed a three-pronged approach to expanding the timetree of Simiiformes to contain 306 species. First, molecular divergence times were searched and found for 21 missing species in timetrees published across 15 studies. Second, untimed molecular phylogenies were searched and scaled to time using relaxed clocks to add four more species. Third, we reconstructed ten new timetrees from genetic data in GenBank, allowing us to incorporate 13 more species. Finally, we assembled the most comprehensive molecular timetree of Simiiformes containing all 306 species for which any molecular data exists. We compared the species divergence times with those previously imputed using statistical approaches in the absence of molecular data. The latter data-less imputed times were not significantly correlated with those derived from the molecular data. Also, using phylogenies containing imputed times produced different trends of evolutionary distinctiveness and speciation rates over time than those produced using the molecular timetree. These results demonstrate that more complete clade-specific timetrees can be produced by analyzing existing information, which we hope will encourage future efforts to fill in the missing taxa in the global timetree of life.

<https://www.frontiersin.org/articles/10.3389/fbinf.2023.1284744/full>

---

## Frontiers in Psychology

### PAPERS

#### LAURA MATHILDE PABST & MARLENE KOLLMAYER – How to make a difference: the impact of gender-fair language on text comprehensibility amongst adults with and without an academic background

The proliferation of gender-fair language as a medium of communication that represents all genders can be considered as an exciting development in today's rapidly changing world. In this context, the use of the gender asterisk has become especially prominent in German, it being a grammatical gender language. However, critics often argue that gender-fair language makes texts less comprehensible and decreases its aesthetic appeal. The present study tests this assumption for the German language and is the first one to test the influence of an academic background on the comprehensibility of gender-fair language.

A text, either written in gender-fair language using the gender star in its singular and plural form or a version using only masculine-only forms, was randomly assigned to 81 adults without an academic background and 82 adults with an academic background (77% women in both groups). Participants were asked to fill out a web-based questionnaire answering questions on text comprehensibility and on their attitudes toward gender-fair language.

The results show no statistically significant difference in comprehensibility ratings between participants who read a text in gender-fair language and those who read a text in masculine-only language. In addition, attitudes toward gender-fair language did not affect comprehensibility ratings in participants who read the text written in gender-fair language using the gender star. Further, the academic background had no effect on the assessment of gender-fair language.

To conclude, the present study suggests that there is no evidence that gender-fair language reduces the comprehensibility of texts.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1234860/full>

---

## iScience

### PAPERS

#### ELENA NAVA, MICHELLE GIRAUD & NADIA BOLOGNINI – The emergence of the multisensory brain: from the womb to the first steps

The becoming of the human being is a multisensory process that starts in the womb. By integrating spontaneous neuronal activity with inputs from the external world, the developing brain learns to make sense of itself through multiple sensory experiences. Over the past ten years, advances in neuroimaging and electrophysiological techniques have allowed the

exploration of the neural correlates of multisensory processing in the newborn and infant brain, thus adding an important piece of information to behavioural evidence of early sensitivity to multisensory events.

Here, we review recent behavioural and neuroimaging findings to document the origins and early development of multisensory processing, particularly showing that the human brain appears naturally tuned to multisensory events at birth, which requires multisensory experience to fully mature.

We conclude the review by highlighting the potential uses and benefits of multisensory interventions in promoting healthy development by discussing emerging studies in preterm infants.

[https://www.cell.com/science/fulltext/S2589-0042\(23\)02835-3](https://www.cell.com/science/fulltext/S2589-0042(23)02835-3)

## Nature

### NEWS

#### **How our brains decode speech: special neurons process certain sounds**

Wire-thin probes inserted into the brains of living people show the parts played by individual neurons.

<https://www.nature.com/articles/d41586-023-03952-0>

#### **'Biocomputer' combines lab-grown brain tissue with electronic hardware**

A system that integrates brain cells into a hybrid machine can recognize voices.

<https://www.nature.com/articles/d41586-023-03975-7>

### PAPERS

#### **MATTHEW K. LEONARD et al – Large-scale single-neuron speech sound encoding across the depth of human cortex**

Understanding the neural basis of speech perception requires that we study the human brain both at the scale of the fundamental computational unit of neurons and in their organization across the depth of cortex. Here we used high-density Neuropixels arrays to record from 685 neurons across cortical layers at nine sites in a high-level auditory region that is critical for speech, the superior temporal gyrus, while participants listened to spoken sentences. Single neurons encoded a wide range of speech sound cues, including features of consonants and vowels, relative vocal pitch, onsets, amplitude envelope and sequence statistics. Neurons at each cross-laminar recording exhibited dominant tuning to a primary speech feature while also containing a substantial proportion of neurons that encoded other features contributing to heterogeneous selectivity. Spatially, neurons at similar cortical depths tended to encode similar speech features. Activity across all cortical layers was predictive of high-frequency field potentials (electrocorticography), providing a neuronal origin for macroelectrode recordings from the cortical surface. Together, these results establish single-neuron tuning across the cortical laminae as an important dimension of speech encoding in human superior temporal gyrus.

<https://www.nature.com/articles/s41586-023-06839-2>

#### **MATTHEW SILCOCKS et al with THE NATIONAL CENTRE FOR INDIGENOUS GENOMICS – Indigenous Australian genomes show deep structure and rich novel variation**

The Indigenous peoples of Australia have a rich linguistic and cultural history. How this relates to genetic diversity remains largely unknown because of their limited engagement with genomic studies. Here we analyse the genomes of 159 individuals from four remote Indigenous communities, including people who speak a language (Tiwi) not from the most widespread family (Pama–Nyungan). This large collection of Indigenous Australian genomes was made possible by careful community engagement and consultation. We observe exceptionally strong population structure across Australia, driven by divergence times between communities of 26,000–35,000 years ago and long-term low but stable effective population sizes. This demographic history, including early divergence from Papua New Guinean (47,000 years ago) and Eurasian groups, has generated the highest proportion of previously undescribed genetic variation seen outside Africa and the most extended homozygosity compared with global samples. A substantial proportion of this variation is not observed in global reference panels or clinical datasets, and variation with predicted functional consequence is more likely to be homozygous than in other populations, with consequent implications for medical genomics. Our results show that Indigenous Australians are not a single homogeneous genetic group and their genetic relationship with the peoples of New Guinea is not uniform. These patterns imply that the full breadth of Indigenous Australian genetic diversity remains uncharacterized, potentially limiting genomic medicine and equitable healthcare for Indigenous Australians.

<https://www.nature.com/articles/s41586-023-06831-w>

#### **ANDRE L. M. REIS et al with THE NATIONAL CENTRE FOR INDIGENOUS GENOMICS – The landscape of genomic structural variation in Indigenous Australians**

Indigenous Australians harbour rich and unique genomic diversity. However, Aboriginal and Torres Strait Islander ancestries are historically under-represented in genomics research and almost completely missing from reference datasets. Addressing this representation gap is critical, both to advance our understanding of global human genomic diversity and as a prerequisite for ensuring equitable outcomes in genomic medicine. Here we apply population-scale whole-genome long-read sequencing to profile genomic structural variation across four remote Indigenous communities. We uncover an abundance of large insertion–deletion variants (20–49 bp; n = 136,797), structural variants (50 b–50 kb; n = 159,912) and regions of



variable copy number (>50 kb; n = 156). The majority of variants are composed of tandem repeat or interspersed mobile element sequences (up to 90%) and have not been previously annotated (up to 62%). A large fraction of structural variants appear to be exclusive to Indigenous Australians (12% lower-bound estimate) and most of these are found in only a single community, underscoring the need for broad and deep sampling to achieve a comprehensive catalogue of genomic structural variation across the Australian continent. Finally, we explore short tandem repeats throughout the genome to characterize allelic diversity at 50 known disease loci, uncover hundreds of novel repeat expansion sites within protein-coding genes, and identify unique patterns of diversity and constraint among short tandem repeat sequences. Our study sheds new light on the dimensions and dynamics of genomic structural variation within and beyond Australia.

<https://www.nature.com/articles/s41586-023-06842-7>

## REVIEWS

### **REBECCA WRAGG SYKES – Were Neanderthals soulful inventors or strange cannibals?**

To understand the true otherness of Neanderthals, researchers must rethink the meaning they give to their archaeological finds.

Review of 'The Naked Neanderthal' by Ludovic Slimak. Allen Lane (2023).

<https://www.nature.com/articles/d41586-023-03862-1>

---

## Nature Communications

### PAPERS

### **FRANCESCO CECCARELLI et al – Static and dynamic coding in distinct cell types during associative learning in the prefrontal cortex**

The prefrontal cortex maintains information in memory through static or dynamic population codes depending on task demands, but whether the population coding schemes used are learning-dependent and differ between cell types is currently unknown. We investigate the population coding properties and temporal stability of neurons recorded from male macaques in two mapping tasks during and after stimulus-response associative learning, and then we use a Strategy task with the same stimuli and responses as control. We identify a heterogeneous population coding for stimuli, responses, and novel associations: static for putative pyramidal cells and dynamic for putative interneurons that show the strongest selectivity for all the variables. The population coding of learned associations shows overall the highest stability driven by cell types, with interneurons changing from dynamic to static coding after successful learning. The results support that prefrontal microcircuitry expresses mixed population coding governed by cell types and changes its stability during associative learning.

<https://www.nature.com/articles/s41467-023-43712-2>

---

## Nature India

### NEWS

### **Unique unchanged DNA stretches define humans and other primates**

These conserved sequences were earlier considered biologically irrelevant.

<https://www.nature.com/articles/d44151-023-00195-w>

---

## Nature Scientific Reports

### PAPERS

### **CRISTINA-IOANA GALUSCA et al – Toddlers' sensitivity to dominance traits from faces**

In adults, seeing individual faces is sufficient to trigger dominance evaluations, even when conflict is absent. From early on, infants represent dyadic dominance relations and they can infer conflict outcomes based on a variety of cues. To date, it is unclear if toddlers also make automatic dominance trait evaluations of individual faces. Here we asked if toddlers are sensitive to dominance traits from faces, and whether their sensitivity depends on their face experience. We employed a visual preference paradigm to study 18- and 24-month-old toddlers' sensitivity to dominance traits from three types of faces: artificial, male, female. When presented with artificial faces (Experiment 1), 18- and 24-month-olds attended longer to the non-dominant faces, but only when they were in upright orientation. For real male faces (Experiment 2), toddlers showed equivalent looking durations to the dominant and non-dominant upright faces. However, when looking at female faces (Experiment 3), toddlers displayed a visual preference for the upright non-dominant faces at 24 months. To our knowledge, this is the first study to show that toddlers already display sensitivity to facial cues of dominance from 18 months of age, at least for artificial face stimuli.

<https://www.nature.com/articles/s41598-023-49385-7>

### **INA REICHE et al – First discovery of charcoal-based prehistoric cave art in Dordogne**

Archaeologists have long been puzzled by the exact age of Paleolithic cave art in Europe especially in the Franco-Cantabrian region with hundreds of decorated caves because the creation of this parietal art (paintings, drawings and engravings) is closely tied to the appearance of first modern humans in Europe and their ways of life. The Dordogne region, one of the richest regions in terms of Paleolithic cave art in the world with more than 200 cave sites, is currently known to provide

---

figures of cave art solely made with mineral coloring matters that cannot be dated directly. Using in-situ non-invasive Raman spectroscopy combined with portable X-ray fluorescence analysis as well as visible and infrared imaging of the decor of the Font-de-Gaume cave, we show the presence of a large number of charcoal-based Paleolithic figures besides others made of iron and manganese oxides in the main galleries for the first time. The creation periods of the cave art at Font-de-Gaume are mainly attributed to the Magdalenian period and probably more complicated constituted of at least two creation phases than commonly established as shown by the direct or partial superimposition of carbon-based and iron- and/or manganese-based figures. Our new results contribute to a better understanding of the organisation of the ornamentation and thus of the imaginary language of our Prehistoric ancestors. The discovery opens new research possibilities for re-reading of the complex panels and absolute radiocarbon dating.

<https://www.nature.com/articles/s41598-023-47652-1>

### **SHANY DROR et al – A citizen science model turns anecdotes into evidence by revealing similar characteristics among Gifted Word Learner dogs**

Dogs that have a vocabulary of object labels (Gifted Word Learner dogs—GWL dogs) have great potential as a comparative model for studying a variety of cognitive mechanisms. However, only a handful of studies, with a small sample size of 1 or 2 dogs, have examined this phenomenon. GWL dogs appear to share many of the same distinctive characteristics, but due to their rarity, it is not clear if these similarities are only anecdotal or indeed reflect characteristics that are similar in these rare individuals. Here we present the first study conducted on a relatively large sample of 41 GWL dogs that were recruited and tested using a citizen science model. After testing the dogs' receptive vocabulary of toy names, we asked the owners to complete a questionnaire about their and their dog's life experiences. Our findings highlight several characteristics that are shared among most GWL dogs, such as their learning speed, their large vocabulary, and that they learned the names of the toys spontaneously, without the explicit intent of their owners. Our findings validate previous anecdotal evidence on common characteristics of GWL dogs and supply additional support to the hypothesis that these dogs represent a unique group of dogs.

<https://www.nature.com/articles/s41598-023-47864-5>

### **GEMA MARTIN-ORDAS – Relational reasoning in wild bumblebees revisited: the role of distance**

In reasoning tasks, non-human animals attend more to relational than to object similarity. It is precisely this focus on relational similarity that has been argued to explain the reasoning gap between humans and other animals. Work with humans has revealed that objects placed near each other are represented to be more similar than objects placed farther apart. Will distance between objects also affect non-human animals' abilities to represent and reason about objects? To test this, wild bumblebees were presented with a spatial reasoning task (with competing object matches) in which the objects or features alone (colour, shape) were placed close together or far apart. Bumblebees spontaneously attended to objects over relations, but only when the objects were far apart. Features alone were not strong enough to drive object matching—suggesting that bumblebees bound colour and shape into their object representations. These findings question whether the ability to focus on and compare objects is what makes human abstract reasoning unique.

<https://www.nature.com/articles/s41598-023-49840-5>

### **JANEK S. LOBMAIER & DARIA KNOCH – Face coverings increase apparent honesty and cooperativeness**

People readily make inferences about trait-like characteristics of another person's face. Since the recent global COVID-19 pandemic, the widespread use of hygienic face masks has led to large proportions of the face being covered. We investigated the effect of face masks on the inference of prosocially relevant characteristics, namely cooperativeness and honesty. Portraits of participants of previous studies from which we knew their "true" prosocial tendencies served as stimuli. These facial stimuli were presented once with and once without a hygienic face mask to 60 naïve participants who rated the faces for cooperativeness and honesty. Results revealed that wearing face masks made people generally appear more cooperative and more honest than without a mask, but that these ratings were unrelated to the true prosocial tendencies of these people. Together, these findings have important implications for social interactions, particularly in contexts where nonverbal communication is essential, such as in healthcare settings, job interviews, and social gatherings.

<https://www.nature.com/articles/s41598-023-49127-9>

### **L. G. VAN DER SLUIS et al – Identification and tentative removal of collagen glue in Palaeolithic worked bone objects: implications for ZooMS and radiocarbon dating**

Collagen glue has been used for nearly two centuries to consolidate bone material, although its prevalence in museum collections is only now becoming visible. Identifying and removing collagen glue is crucial before the execution of any geochemical or molecular analyses. Palaeolithic bone objects from old excavations intended for radiocarbon dating were first analysed using ZooMS (Zooarchaeology by Mass Spectrometry) to identify the animal species, however peaks characteristic of both cattle and whale were discovered. Two extraction methods for ZooMS were tested to identify the authentic animal species of these objects, which revealed that these were originally whale bone objects that had been consolidated with cattle collagen glue. This is the first time animal collagen glue has been identified in archaeological remains with ZooMS, illustrating again the incredible versatility of this technique. Another technique, Fourier Transform Infrared Spectroscopy in Attenuated

Total Reflectance mode (FTIR-ATR), was also tested if it could rapidly identify the presence of collagen glue in archaeological bone material, which was not the case. Two other cleaning methods were tested to remove bone glue contamination prior to radiocarbon dating, along with two modified collagen extraction methods for ZooMS. These methods were applied to bone blank samples ( $FmC = 0.0031 \pm 0.0002$ ,  $n = 219$ ),  $47\,336 \pm 277$  yr BP) that were experimentally consolidated with collagen glue and to the Palaeolithic bone material (ca. 15 000 and 12 000 yr BP). The experimental bone blanks produced excellent  $^{14}C$  ages, suggesting the cleaning methods were successful, however the  $^{14}C$  ages for some of the Palaeolithic material remained too young considering their contextual age, suggesting that the collagen glue contamination had most likely cross-linked to the authentic collagen molecule. More research is needed in order to gain a deeper understanding of the occurrence and elimination of cross-linked collagen-based glues in material from museum collections.

<https://www.nature.com/articles/s41598-023-49242-7>

#### **NAHYEON LEE et al – Social dilemma in foraging behavior and evolution of cooperation by learning**

We consider foraging behaviors in a two-dimensional continuum space and show that a cooperative chasing strategy can emerge in a social dilemma. Predators can use two different chasing strategies: A direct chasing strategy (DCS) and a group chasing strategy (GCS). The DCS is a selfish strategy with which a chaser moves straight toward the nearest prey, and the GCS is a cooperative strategy in the sense that the chaser chooses the chasing direction for the group at a cost of its own speed. A prey flees away from the nearest hazard, either a chaser or the boundary, within its recognition range. We check the capturing activities of each strategy and find a social dilemma between the two strategies because the GCS is more efficient for the group whereas the DCS is better individually. Using a series of numerical simulations, we further show that the cooperative strategy can proliferate when a learning process of nearby successful strategies is introduced.

<https://www.nature.com/articles/s41598-023-49368-8>

### Neuron

#### PAPERS

#### **TAE-YONG CHOI et al – Distinct prefrontal projection activity and transcriptional state conversely orchestrate social competition and hierarchy**

Social animals compete for limited resources, resulting in a social hierarchy. Although different neuronal subpopulations in the medial prefrontal cortex (mPFC), which has been mechanistically implicated in social dominance behavior, encode distinct social competition behaviors, their identities and associated molecular underpinnings have not yet been identified. In this study, we found that mPFC neurons projecting to the nucleus accumbens (mPFC-NAc) encode social winning behavior, whereas mPFC neurons projecting to the ventral tegmental area (mPFC-VTA) encode social losing behavior. High-throughput single-cell transcriptomic analysis and projection-specific genetic manipulation revealed that the expression level of POU domain, class 3, transcription factor 1 (*Pou3f1*) in mPFC-VTA neurons controls social hierarchy. Optogenetic activation of mPFC-VTA neurons increases *Pou3f1* expression and lowers social rank. Together, these data demonstrate that discrete activity and gene expression in separate mPFC projections oppositely orchestrate social competition and hierarchy.

[https://www.cell.com/neuron/fulltext/S0896-6273\(23\)00886-3](https://www.cell.com/neuron/fulltext/S0896-6273(23)00886-3)

### New Scientist

#### NEWS

#### **Gesturing as you talk may help you speak a new language like a local**

Talking with your hands may help you stress the correct parts of words as you learn a new language.

<https://www.newscientist.com/article/2405210-gesturing-as-you-talk-may-help-you-speak-a-new-language-like-a-local/>

#### **Honeyguide birds respond to special calls from human honey-hunters**

Honey-hunters from several African cultures use different sounds to communicate with honeyguides, and the birds respond to local calls more than others.

<https://www.newscientist.com/article/2407225-honeyguide-birds-respond-to-special-calls-from-human-honey-hunters/>

### Philosophical Transactions of the Royal Society B

#### PAPERS

#### **PETER J. RICHERSON, ROBERT T. BOYD & CHARLES EFFERSON – Agentic processes in cultural evolution: relevance to Anthropocene sustainability**

Humans have evolved culturally and perhaps genetically to be unsustainable. We exhibit a deep and consistent pattern of short-term resource exploitation behaviours and institutions. We distinguish agentic and naturally selective forces in cultural evolution. Agentic forces are quite important compared to the blind forces (random variation and natural selection) in cultural evolution and gene-culture coevolution. We need to use the agentic policy-making processes to evade the impact of blind natural selection. We argue that agentic forces became important during our Pleistocene history and into the Anthropocene present. Human creativity in the form of deliberate innovations and the deliberate selective diffusion of technical and social advances drove this process forward for a long time before planetary limits became a serious issue. We

review models with multiple positive feedbacks that roughly fit this observed pattern. Policy changes in the case of large-scale existential threats like climate change are made by political and diplomatic agents grasping and moving levers of institutional power in order to avoid the operation of blind natural selection and agentic forces driven by narrow or short-term goals.

<https://royalsocietypublishing.org/doi/10.1098/rstb.2022.0252>

## PLoS One

### PAPERS

#### **ANDUS WING-KUEN WONG et al – Tonal and syllabic encoding in overt Cantonese Chinese speech production: An ERP study**

This study was conducted to investigate how syllables and lexical tones are processed in Cantonese speech production using the picture-word interference task with concurrent recording of event-related brain potentials (ERPs). Cantonese-speaking participants were asked to name aloud individually presented pictures and ignore an accompanying auditory word distractor. The target and distractor either shared the same word-initial syllable with the same tone (Tonal-Syllable related), the same word-initial syllable without the same tone (Atonal-Syllable related), the same tone only (Tone alone related), or were phonologically unrelated. Participants' naming responses were faster, relative to an unrelated control, when the target and distractor shared the same tonal- or atonal-syllable but null effect was found in the Tone alone related condition. The mean ERP amplitudes (per each 100-ms time window) were subjected to stimulus-locked (i.e., time-locked to stimulus onset) and response-locked (i.e., time-locked to response onset) analyses. Significant differences between related and unrelated ERP waves were similarly observed in both Tonal-Syllable related and Atonal-Syllable related conditions in the time window of 400–500 ms post-stimulus. However, distinct ERP effects were observed in these two phonological conditions within the 500-ms pre-response period. In addition, null effects were found in the Tone alone related condition in both stimulus-locked and response-locked analyses. These results suggest that in Cantonese spoken word production, the atonal syllable of the target is retrieved first and then associated with the target lexical tone, consistent with the view that tone has an important role to play at a late stage of phonological encoding in tonal language production.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0295240>

#### **JÛLIDE KUBAT et al – Geometric morphometrics and paleoproteomics enlighten the paleodiversity of Pongo**

Pleistocene *Pongo* teeth show substantial variation in size and morphology, fueling taxonomic debates about the paleodiversity of the genus. We investigated prominent features of the enamel-dentine-junction (EDJ)—phylogenetically informative internal structures—of 71 fossil *Pongo* lower molars from various sites by applying geometric morphometrics and conducted paleoproteomic analyses from enamel proteins to attempt to identify extinct orangutan species. Forty-three orangutan lower molars representing *Pongo pygmaeus* and *Pongo abelii* were included for comparison. The shape of the EDJ was analyzed by placing five landmarks on the tip of the main dentine horns, and 142 semilandmarks along the marginal ridges connecting the dentine horns. Paleoproteomic analyses were conducted on 15 teeth of Late Pleistocene *Pongo* using high-resolution tandem mass spectrometry. The geometric morphometric results show variations in EDJ shape regarding aspects of the height and position of the dentine horns and connecting ridges. Despite the issue of molar position and sample size, modern molars are distinguished from fossil counterparts by their elongated tooth outline and narrowly positioned dentine horns. Proteomic results show that neither a distinction of *P. pygmaeus* and *P. abelii*, nor a consistent allocation of fossil specimens to extant species is feasible. Based on the EDJ shape, the (late) Middle to Late Pleistocene *Pongo* samples from Vietnam share the same morphospace, supporting the previous allocation to *P. devosi*, although substantial overlap with Chinese fossils could also indicate close affinities with *P. weidenreichi*. The hypothesis that both species represent one chronospecies cannot be ruled out. Two fossil specimens, one from Tam Hay Marklot (Laos, Late Pleistocene), and another from Sangiran (Java, Early to Middle Pleistocene), along with some specimens within the Punung sample (Java), exhibit affinities with *Pongo abelii*. The Punung fossils might represent a mix of early Late Pleistocene and later specimens (terminal Pleistocene to Holocene) related to modern *Pongo*. The taxonomy and phylogeny of the complete Punung sample needs to be further investigated.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0291308>

#### **KASUN VITHANAGE et al – Accelerating language emergence by functional pressures**

In language emergence, neural agents acquire communication skills by interacting with one another and the environment. Through these interactions, agents learn to connect or ground their observations to the messages they utter, forming a shared consensus about the meaning of the messages. Such connections form what we refer to as a grounding map. However, these maps can often be complicated, unstructured, and contain redundant connections. In this paper, we introduce two novel functional pressures, modeled as differentiable auxiliary losses, to simplify and structure the grounding maps. The first pressure enforces compositionality via topological similarity, which has been previously discussed but has not been modeled or utilized as a differentiable auxiliary loss. The second functional pressure, which is conceptually novel, imposes sparsity in the grounding map by pruning weaker connections while strengthening the stronger ones. We conduct experiments in multiple value-attribute environments with varying communication channels. Our methods achieve improved out-of-domain regularization and rapid convergence over baseline approaches. Furthermore, introduced functional pressures

are robust to the changes in experimental conditions and able to operate with minimum training data. We note that functional pressures cause simpler and more structured emergent languages showing distinct characteristics depending on the functional pressure employed. Enhancing grounding map sparsity yields the best performance and the languages with the most compressible grammar. In summary, our novel functional pressures, focusing on compositionality and sparse groundings, expedite the development of simpler, more structured languages while enhancing their generalization capabilities. Exploring alternative types of functional pressures and combining them in agent training may be beneficial in the ongoing quest for improved emergent languages.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0295748>

### **JOHN M. MCBRIDE, SAM PASSMORE & TSVI TLUSTY – Convergent evolution in a large cross-cultural database of musical scales**

Scales, sets of discrete pitches that form the basis of melodies, are thought to be one of the most universal hallmarks of music. But we know relatively little about cross-cultural diversity of scales or how they evolved. To remedy this, we assemble a cross-cultural database (Database of Musical Scales: DaMuSc) of scale data, collected over the past century by various ethnomusicologists. Statistical analyses of the data highlight that certain intervals (e.g., the octave, fifth, second) are used frequently across cultures. Despite some diversity among scales, it is the similarities across societies which are most striking: step intervals are restricted to 100-400 cents; most scales are found close to equidistant 5- and 7-note scales. We discuss potential mechanisms of variation and selection in the evolution of scales, and how the assembled data may be used to examine the root causes of convergent evolution.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0284851>

### **HENI YUWONO et al – Do psychological capital and transformational leadership make differences in organizational citizenship behavior?**

This research is proposed to determine factors affecting organizational citizenship behavior (OCB), tested on counselors, totaling 156 respondents. This study applied three waves in data collection with an interval of 30 days and a multigroup analysis to validate OCB. The analysis technique used is the Structural Equation Modeling (SEM) method using the IBM SPSS AMOS v26. The results showed that transformational leadership and psychological capital could, directly and indirectly, influence OCB and substantially affect work engagement as the mediator. Furthermore, male counselors with OCB were more dominantly influenced by work engagement, whereas female counselors were by transformational leadership. The results of this study can be used as a basis for policy recommendations by organizational management, especially organizations in the public service. This research has strengthened the empirical foundation on voluntary extra-role behavior and initiatives that can improve organizational effectiveness. This behavior can be manifested by strengthening psychological capital, transformational leadership, and work engagement.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0294559>

### **MAGDALENA BLANZ et al – Early Neolithic pastoral land use at Alsónyék-Bátaszék, Hungary (Starčevo culture): New insights from stable isotope ratios**

The earliest introduction of livestock (cattle, goats, sheep, pigs) into the Carpathian Basin was an important step towards farming expansion into continental Europe. This spread beyond the environments of the southern Balkans was accompanied by a reduction in the spectrum of cultivated crops, changes in the relative representation of different domestic animals, and, most likely, adaptations of husbandry practices. How the earliest farmers in the Carpathian Basin kept their domestic stock is still understudied. We explored early animal management and land use strategies at the Starčevo settlement at Alsónyék-Bátaszék, Hungary (Early Neolithic, ca. 5800–5600 cal BC). Settled at the intersection of wide alluvial plains, waterlogged meadows and marshes to the east, and forested hills to the west, early farmers at Alsónyék had a wide variety of options for nourishing their livestock. We performed stable isotope ratio analysis of bone collagen ( $n = 99$ ;  $\delta^{13}C$ ,  $\delta^{15}N$ ) and tooth enamel (n teeth = 28, sequentially sampled for  $\delta^{13}C$  and  $\delta^{18}O$ ) from wild and domestic animals to locate them in the landscape and investigate herding practices on a seasonal scale. The bone collagen isotope ratios mostly indicate feeding in open environments. However, results from the sequential analysis of cattle and sheep enamel suggest diverse dietary strategies for winters, including consumption of forest resources, consumption of summer hay and grazing in an open environment. Most pigs appear to have had herbivorous diets, but several individuals likely supplemented their diet with animal protein. Stable isotope ratio results from the Lengyel phase at Alsónyék (ca. 4800–4300 cal BC) suggest more access to animal protein for pigs, and feeding in more open areas by wild boar, red deer and cattle compared to the Starčevo phase. This study's results demonstrate considerable variability in early animal husbandry practices at Alsónyék.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0295769>



---

## Proceedings of the Royal Society B

### PAPERS

#### **JULY A. PILOWSKY et al – Millennial processes of population decline, range contraction and near extinction of the European bison**

European bison (*Bison bonasus*) were widespread throughout Europe during the late Pleistocene. However, the contributions of environmental change and humans to their near extinction have never been resolved. Using process-explicit models, fossils and ancient DNA, we disentangle the combinations of threatening processes that drove population declines and regional extinctions of European bison through space and across time. We show that the population size of European bison declined abruptly at the termination of the Pleistocene in response to rapid environmental change, hunting by humans and their interaction. Human activities prevented populations of European bison from rebounding in the Holocene, despite improved environmental conditions. Hunting caused range loss in the north and east of its distribution, while land use change was responsible for losses in the west and south. Advances in hunting technologies from 1500 CE were needed to simulate low abundances observed in 1870 CE. While our findings show that humans were an important driver of the extinction of the European bison in the wild, vast areas of its range vanished during the Pleistocene–Holocene transition because of post-glacial environmental change. These areas of its former range have been climatically unsuitable for millennia and should not be considered in reintroduction efforts.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.1095>

---

## Royal Society Open Science

### PAPERS

#### **RUTH E. CORPS, FANG YANG & MARTIN J. PICKERING – Evidence against egocentric prediction during language comprehension**

Although previous research has demonstrated that language comprehension can be egocentric, there is little evidence for egocentricity during prediction. In particular, comprehenders do not appear to predict egocentrically when the context makes it clear what the speaker is likely to refer to. But do comprehenders predict egocentrically when the context does not make it clear? We tested this hypothesis using a visual-world eye-tracking paradigm, in which participants heard sentences containing the gender-neutral pronoun *They* (e.g. *They would like to wear...*) while viewing four objects (e.g. tie, dress, drill, hairdryer). Two of these objects were plausible targets of the verb (tie and dress), and one was stereotypically compatible with the participant's gender (tie if the participant was male; dress if the participant was female). Participants rapidly fixated targets more than distractors, but there was no evidence that participants ever predicted egocentrically, fixating objects stereotypically compatible with their own gender. These findings suggest that participants do not fall back on their own egocentric perspective when predicting, even when they know that context does not make it clear what the speaker is likely to refer to.

<https://royalsocietypublishing.org/doi/10.1098/rsos.231252>

---

## Science

### REVIEWS

#### **JOHN ROBB – Object lessons**

An anthropologist confronts the history and ubiquity of human-made items.

A review of 'So Much Stuff: How Humans Discovered Tools, Invented Meaning, and Made More of Everything' by Chip Colwell. University of Chicago Press, 2023.

<https://www.science.org/doi/10.1126/science.adl1546>

---

## Science Advances

### PAPERS

#### **GABRIEL CASTRILLON et al – An energy costly architecture of neuromodulators for human brain evolution and cognition**

In comparison to other species, the human brain exhibits one of the highest energy demands relative to body metabolism. It remains unclear whether this heightened energy demand uniformly supports an enlarged brain or if specific signaling mechanisms necessitate greater energy. We hypothesized that the regional distribution of energy demands will reveal signaling strategies that have contributed to human cognitive development. We measured the energy distribution within the brain functional connectome using multimodal brain imaging and found that signaling pathways in evolutionarily expanded regions have up to 67% higher energetic costs than those in sensory-motor regions. Additionally, histology, transcriptomic data, and molecular imaging independently reveal an up-regulation of signaling at G-protein-coupled receptors in energy-demanding regions. Our findings indicate that neuromodulator activity is predominantly involved in cognitive functions, such as reading or memory processing. This study suggests that an up-regulation of neuromodulator activity, alongside increased brain size, is a crucial aspect of human brain evolution.

<https://www.science.org/doi/10.1126/sciadv.adi7632>

---



## Trends in Cognitive Sciences

### PAPERS

#### **ONUR GÜNTÜRKÜN, ROLAND PUSCH & JONAS ROSE – Why birds are smart**

Many cognitive neuroscientists believe that both a large brain and an isocortex are crucial for complex cognition. Yet corvids and parrots possess non-cortical brains of just 1–25 g, and these birds exhibit cognitive abilities comparable with those of great apes such as chimpanzees, which have brains of about 400 g. This opinion explores how this cognitive equivalence is possible. We propose four features that may be required for complex cognition: a large number of associative pallial neurons, a prefrontal cortex (PFC)-like area, a dense dopaminergic innervation of association areas, and dynamic neurophysiological fundaments for working memory. These four neural features have convergently evolved and may therefore represent 'hard to replace' mechanisms enabling complex cognition.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00281-4](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00281-4)

---

## Trends in Ecology and Evolution

### PAPERS

#### **WAYNE WU – We know what attention is!**

Attention is one of the most thoroughly investigated psychological phenomena, yet skepticism about attention is widespread: we do not know what it is, it is too many things, there is no such thing. The deficiencies highlighted are not about experimental work but the adequacy of the scientific theory of attention. Combining common scientific claims about attention into a single theory leads to internal inconsistency. This paper demonstrates that a specific functional conception of attention is incorporated into the tasks used in standard experimental paradigms. In accepting these paradigms as valid probes of attention, we commit to this common conception. The conception unifies work at multiple levels of analysis into a coherent scientific explanation of attention. Thus, we all know what attention is.

*{Hmm, maybe not. We may know what "attention to" involves, just as we know what "consciousness of" is (and they are not the same thing). But this gets us no closer to understanding what "attention" or "consciousness" are, although we can say that "attention is the process behind attention-to, and consciousness is the process behind consciousness-of". Without the adpositions, there is no describable "thingness". Just my opinion, though.}*

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00286-3](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00286-3)

---

## SUBSCRIBE to the EAORC Bulletin

If you would like to subscribe to this free weekly newsletter, please contact [martin.edwardes@btopenworld.com](mailto:martin.edwardes@btopenworld.com).

---

## UNSUBSCRIBE from the EAORC Bulletin

Send an email to [martin.edwardes@btopenworld.com](mailto:martin.edwardes@btopenworld.com) with the subject "EAORC unsubscribe".

---

## PRODUCED BY AND FOR THE EAORC EMAIL GROUP

EAORC is a fee-free academic internet news service and has no commercial sponsorship or other commercial interests.

EAORC website information is at <http://martinedwardes.me.uk/eaorc/>

If you have received this bulletin, and are unhappy about receiving it, please contact [martin.edwardes@btopenworld.com](mailto:martin.edwardes@btopenworld.com).

---