

EAORC BULLETIN 1,213 – 13 September 2026

CONTENTS

NOTICES.....	2
FORMATTED VERSION OF THIS BULLETIN.....	2
PUBLICATION ALERTS.....	2
EDITORIAL INTERJECTIONS.....	2
ACADEMIA.EDU – From the origin of language to the diversification of languages.....	2
FRANCESCO D'ERRICO et al with CHRISTOPHER HENSHILWOOD – From the origin of language to the diversification of languages: What can archaeology and palaeoanthropology say?	3
NEWS.....	3
NATURE BRIEFING – Skeleton teeth show signs of early drug use.....	3
NATURE BRIEFING – Fossil trove sheds new light on Denisovans.....	3
NEW SCIENTIST HUMAN STORY – Denisovans may have dwarfed other ancient humans.....	3
NEW SCIENTIST HUMAN STORY – DNA reveals a society organised around women in pre-Roman Britain.....	3
NEW SCIENTIST HUMAN STORY – Monsoon-driven wildfires may have shaped human evolution.....	3
NEW SCIENTIST HUMAN STORY – We still don't know when humans began.....	3
NEW SCIENTIST HUMAN STORY – Did humans evolve to be active throughout the day and night?	3
NEWS FROM SCIENCE – Denisovans were strong & agile hunters, fossil elbow and primitive tools suggest	3
NEWS FROM SCIENCE – Why are human births so difficult? Male babies may be to blame	4
SCIENCEADVISER – Ancient regimes had druggy rituals.....	4
SCIENCEADVISER – Deadly Denisovans.....	4
SCIENCEADVISER – Carry on, my costly son.....	4
PUBLICATIONS.....	5
Current Biology	5
ARTICLES.....	5
MICHAEL GROSS – How languages evolve and die	5
PAPERS.....	5
PRANAV MISRA et al – Invariant neural representation of parts of speech in the human brain	5
eLife.....	5
PAPERS.....	5
KRISTOPHER T JENSEN et al – A mechanistic theory of planning in prefrontal cortex	5
Frontiers in Communication.....	5
PAPERS.....	5
DARRELL DOOYEMA – A War of Words: Wittgenstein, Language Games, and the Loss of Trust in the 21st Century.....	5
Frontiers in Psychology	6
PAPERS.....	6
MARYANNE L. FISHER et al – Kill them with kindness: preliminary evidence for women's competitive altruism	6
iScience.....	6
PAPERS.....	6
KOSTAS HADJIDIMITRAKIS et al – Behavioral states affect eye position tuning in the parietal cortex of macaques	6
Nature	6
NEWS	6
Who were the Denisovans? Rich trove of fossils and tools paints new picture	6
PAPERS.....	6
HUIYUN RAO et al – Ancient proteins identify various Denisovan remains from Southwest China.....	6
QIJUN RUAN et al – Denisovans from southwestern China and their subsistence strategies.....	6
Nature Africa.....	7
ARTICLES.....	7
ELSABE BRITS – Ancient tooth proteins deepen the Homo naledi mystery.....	7
Nature Genetics	7
ARTICLES.....	7
PETRA GROSS – Tracing 'ghost' ancestry in modern humans	7

Nature Scientific Reports.....	7
PAPERS	7
MARLEN KÜCKLICH et al – Multimodal fertility cues in chimpanzees: how body odours complement sexual swellings.....	7
New Scientist	7
NEWS	7
Pygmy raccoons teach each other to make toys out of paper and sand	7
ARTICLES	8
MICHAEL MARSHALL – Denisovan tools from cave in China show how mysterious humans lived.....	8
REVIEWS	8
MICHAEL MARSHALL – fascinating deep dive into the real Vikings	8
NPJ Heritage Science	8
PAPERS	8
SIMON RADCHENKO et al – Internal structure of Mammoth ivory inspired the design of Mizyn (Ukraine) Upper Palaeolithic figurines.....	8
Proceedings of the Royal Society A.....	8
PAPERS	8
ANTHONY CLARKE, JIM LEARY & CHRIS KIRKLAND – Deliberate prehistoric sourcing of the Devil's Arrows, Britain's tallest stone row	8
Proceedings of the Royal Society B.....	8
PAPERS	8
EMILIE RAPPORT MUNRO et al with JOSEP CALL – Chimpanzees attribute agency to virtual animals, but not to self-propelled shapes	8
Royal Society Open Science.....	9
PAPERS	9
STAV SUBACH et al – Using computer games to explore foraging-predation trade-offs and spatial learning in humans	9
Science Advances.....	9
PAPERS	9
ADAM BRUMM et al – Betel nut sucking is the earliest recorded evidence for the habitual use of a neuroactive plant drug	9
Trends in Cognitive Sciences	9
PAPERS	9
JAKE QUILTY-DUNN & JUSTIN N. WOOD – The nativist–empiricist debate is broken	9
OSHIN VARTANIAN et al – Valuation as a bridge between aesthetics and creativity	9
Trends in Genetics	10
PAPERS	10
R. ALEXANDER PYRON & TIMOTHY J. COLSTON – Hologenomic interactions promote the higher-order evolvability of phenotypic complexity.....	10
Trends Open	10
PAPERS	10
EVA JABLONKA & SAMUEL R. COHEN – Aphantasia and the evolution of language	10
SUBSCRIBE to the EAORC Bulletin	10
UNSUBSCRIBE from the EAORC Bulletin	10
PRODUCED BY AND FOR THE EAORC EMAIL GROUP	10

NOTICES

FORMATTED VERSION OF THIS BULLETIN

A pdf formatted version of this Bulletin is available for download at martinedwardes.me.uk/eaorc/eaorc_bulletins.htm.

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, and doesn’t object to being called out on it.

ACADEMIA.EDU – From the origin of language to the diversification of languages

In Becoming Eloquent: Advances in the emergence of language, human cognition, and modern cultures. Edited by Francesco d'Errico & Jean-Marie Hombert (eds.). John Benjamins Publishing Company (2009).

FRANCESCO D'ERRICO et al with CHRISTOPHER HENSHILWOOD – From the origin of language to the diversification of languages: What can archaeology and palaeoanthropology say?

In this paper we recall the arguments put forward in an attempt to link language origins and specific elements of the fossil record (pigment use, burial practices, personal ornaments, production of depictions and carvings, musical traditions, various anatomical features), and summarise the scenarios proposed by palaeoanthropologists and archaeologists to account for the emergence of modern behavioral traits. This review challenges the idea of a strict link between biological and behavioural change and suggests that modern cognition and language are results of a gradual, complex and non-linear process to whose advancement different human populations and possibly a number of fossil human species have contributed.

https://www.academia.edu/8238447/d_Errico_F_Vanhaeren_M_Henshilwood_et_al_2009_From_the_origin_of_language_to_the_diversification_of_languages_What_can_archaeology_and_palaeoanthropology_say In F dErrico and J M Hombert eds *Becoming Eloquent* Amsterdam John Benjamins Publishing Company 13 68

NEWS

NATURE BRIEFING – Skeleton teeth show signs of early drug use

Traces of mind-altering substances found in the teeth of two skeletons discovered in Indonesia could be evidence of the earliest known habitual drug use. The skeletons' teeth showed considerable signs of wear and contained traces of the compound arecoline, which suggest that the pair regularly sucked on psychoactive betel nuts. One of the skeletons dates to 16,000–25,000 years ago, which hints that this behaviour predates betel chewing, a drug-taking method still in use today.

<https://www.theguardian.com/science/2026/sep/09/indonesian-foragers-mind-altering-nuts-research-finds>

NATURE BRIEFING – Fossil trove sheds new light on Denisovans

A collection of fossils and artefacts recovered from an abandoned quarry in southwestern China has given researchers an unprecedented glimpse into the lives of ancient humans called Denisovans. The items suggest that Denisovans — who lived at the site for at least 30,000 years — crafted bone tools similar to those of the Neanderthals, and were skilled hunters of animals such as deer. “This site’s the full package,” says archaeologist Ben Marwick. “It’s the first site that we have with a long, rich sequence that’s uniquely associated with Denisovans.”

<https://www.nature.com/articles/d41586-026-02810-z>

NEW SCIENTIST HUMAN STORY – Denisovans may have dwarfed other ancient humans

Two leg bones found on the seabed near Taiwan have been identified as Denisovans, and their size suggests these hominins stood up to 190 centimetres tall.

<https://www.newscientist.com/article/2584088-denisovans-may-have-dwarfed-other-ancient-humans/>

NEW SCIENTIST HUMAN STORY – DNA reveals a society organised around women in pre-Roman Britain

Clans in north-east England were organised around maternal lineage prior to the Roman conquest of Britain, a study of more than 500 Iron Age individuals suggests.

<https://www.newscientist.com/article/2584364-dna-reveals-a-society-organised-around-women-in-pre-roman-britain/>

NEW SCIENTIST HUMAN STORY – Monsoon-driven wildfires may have shaped human evolution

A reconstruction of East Africa's environment 1.75 million years ago suggests wildfires spiked during wetter times, which may have influenced human evolution.

<https://www.newscientist.com/article/2584578-monsoon-driven-wildfires-may-have-shaped-human-evolution/>

NEW SCIENTIST HUMAN STORY – We still don't know when humans began

Scientists once believed they could pinpoint the moment when humans first appeared. But as new fossils have filled in our evolutionary history, that defining moment has begun to disappear – replaced by a far stranger picture of what it means to be human.

<https://www.newscientist.com/video/2584650-we-still-dont-know-when-humans-began/>

NEW SCIENTIST HUMAN STORY – Did humans evolve to be active throughout the day and night?

Evidence from hunter-gatherers suggests humans aren't diurnal but cathemeral, with bouts of activity at nighttime – a sleep pattern similar to some lemurs.

<https://www.newscientist.com/article/2584951-did-humans-evolve-to-be-active-throughout-the-day-and-night/>

NEWS FROM SCIENCE – Denisovans were strong & agile hunters, fossil elbow and primitive tools suggest

The first arm bone fragment from these mysterious human relatives was found near cutting instruments and animal remains in southwestern China.

<https://www.science.org/content/article/mysterious-human-relatives-were-strong-and-agile-fossil-elbow-and-primitive-tools>

NEWS FROM SCIENCE – Why are human births so difficult? Male babies may be to blame

Analysis of 140 species suggests the risks of sons are offset by evolutionary advantages.

<https://www.science.org/content/article/why-are-human-births-so-difficult-male-babies-not-just-upright-walking-may-be-blame>

SCIENCEADVISER – Ancient regimes had druggy rituals

The journey of humans into South America was a strange trip—literally. When people arrived some 15,000 years ago, they encountered an ecologically diverse continent peculiarly rich in psychoactive plants. Botanists estimate more than 100 species there significantly alter human consciousness, accounting for more than two-thirds of the global total.

Perhaps, then, it's no surprise that psychoactive substances played a starring role in many of the empires that arose there, particularly in the Andes. Reporter Andrew Lawler's feature this week in Science explores how modern chemistry and archaeology are shedding light on how such drugs were used to shape ancient societies.

For example, better detection methods and a better understanding of plant chemistry have given scientists a peek into how the priestly class at Peru's Chavín de Huántar site took advantage of substances like seeds from the vilca tree. These seeds contain bufotenine; dimethyltryptamine (DMT); and 5-MEO-DMT, a combination that produces short-lived but extremely intense visions.

Rulers at Chavín may have invited other regional leaders to join them in a subterranean ceremonial space, eerily lit with echoing walls. Priests, then, may have blown a mix of crushed vilca seeds and tobacco up their nose, kicking off a hallucinogenic trip. The ceremony may have included masks, loud noises, lights, and storytelling to craft a vision that left the visitors with a strong impression: that those at Chavín could commune with a higher plane of existence. That's a politically useful tool—and one that scientists are realizing several Andean empires likely employed throughout history.

<https://www.science.org/content/article/mind-altering-drugs-played-key-role-rise-andean-civilization>

SCIENCEADVISER – Deadly Denisovans

Seven ancient human fossils and a cache of tools and animal remains found in a cave in southwestern China are illuminating the looks and lifeways of the mysterious Denisovans, who were likely strong and agile hunters. "Denisovans are no longer just a molecular ghost," one paleoanthropologist said.

<https://www.science.org/content/article/mysterious-human-relatives-were-strong-and-agile-fossil-elbow-and-primitive-tools>

SCIENCEADVISER – Carry on, my costly son

Every day, about 700 people die giving birth around the world. A leading cause is obstructed labor, often due to the baby's head exceeding the size of the birth canal. Even successful births require fetal acrobatics to navigate the narrow path from womb to world: Babies typically enter the pelvis sideways, twist, and rotate as they emerge. Anthropologists have long assumed such perilous births evolved through a tug-of-war between large brains and upright walking, which ultimately has favored a pelvis that's scrunched front to back.

But recent studies have questioned the simplicity of this explanation—and whether the phenomenon, known as the obstetrical dilemma, is even unique to humans. Now, a new study out in *The Anatomical Record* adds another wrinkle to the dilemma: fetal sex.

Reviewing birth data for 140 species, the authors argue that sons are more difficult to birth than daughters for many mammals, including humans and our ancient ancestors. The authors found this pattern in five domesticated animals: cattle, water buffalo, sheep, goats, and a breed of American racehorse. That's also the case in captive antelope and Asian elephants. The pattern holds in cattle and sheep, even when controlling for birth weight, suggesting in addition to sheer size, factors such as sex differences in fetal shape and behavior could contribute to males causing more trouble during birth.

This added risk of this phenomenon, which the researchers dubbed the "costly son" hypothesis, may be offset by an evolutionary reward: Bigger male babies grow into bigger male adults, who tend to have more grandbabies, meaning more of that mother's genes are passed down.

<https://www.science.org/content/article/why-are-human-births-so-difficult-male-babies-not-just-upright-walking-may-be-blame>

PUBLICATIONS

Current Biology

ARTICLES

MICHAEL GROSS – How languages evolve and die

Languages have evolved, spread and diversified with human populations, like other culturally transmitted traits in humans and other species. The introduction of agriculture, however, enabled larger communities, leading to the rise of states and empires, and ultimately to a loss of language diversity. A modelling study estimates the trajectory of the decline.

[https://www.cell.com/current-biology/abstract/S0960-9822\(26\)01094-8](https://www.cell.com/current-biology/abstract/S0960-9822(26)01094-8)

PAPERS

PRANAV MISRA et al – Invariant neural representation of parts of speech in the human brain

Elucidating the internal representation of language in the brain has major implications for cognitive science, brain disorders, and artificial intelligence. A pillar of linguistic studies is the notion that words have defined functions, often referred to as parts of speech. Here, we recorded invasive neurophysiological responses from 1,801 electrodes in 20 patients with pharmacologically resistant epilepsy while they were presented with two-word phrases consisting of an adjective and a noun. We observed neural signals that distinguished between these two parts of speech. The representation of parts of speech showed invariance across visual and auditory presentation modalities; robustness to word properties such as length, order, frequency, and semantics; and even generalization across different languages. The selective signals were circumscribed within a small region in the left lateral orbitofrontal cortex. This selective, invariant, and localized representation of parts of speech extends classic fronto-temporal language models, providing a target for mechanistic and causal tests of how the brain represents the basic building blocks of language, and introduces a systematic approach to elucidate the orchestration of more complex aspects of language.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(26\)00928-0](https://www.cell.com/current-biology/fulltext/S0960-9822(26)00928-0)

eLife

PAPERS

KRISTOPHER T JENSEN et al – A mechanistic theory of planning in prefrontal cortex

Planning is critical for adaptive behaviour in a changing world, because it lets us anticipate the future and adjust our actions accordingly. While prefrontal cortex is crucial for this process, it remains unknown how planning is implemented in neural circuits. Prefrontal representations were recently discovered in simpler sequence memory tasks, where different populations of neurons represent different future time points. We demonstrate that combining such representations with the ubiquitous principle of neural attractor dynamics allows circuits to solve much richer problems including planning. This is achieved by embedding the environment structure directly in synaptic connections to implement an attractor network that infers desirable futures. The resulting 'spacetime attractor' excels at planning in challenging tasks known to depend on prefrontal cortex. Recurrent neural networks trained by gradient descent on such tasks learn a solution that precisely recapitulates the spacetime attractor – in representation, in dynamics, and in connectivity. Analyses of networks trained across different environment structures reveal a generalisation mechanism that rapidly reconfigures the world model used for planning, without the need for synaptic plasticity. The spacetime attractor is a testable mechanistic theory of planning. If true, it would provide a path towards detailed mechanistic understanding of how prefrontal cortex structures adaptive behaviour.

<https://elifesciences.org/reviewed-preprints/109757>

Frontiers in Communication

PAPERS

DARRELL DOOYEMA – A War of Words: Wittgenstein, Language Games, and the Loss of Trust in the 21st Century

Ludwig Wittgenstein's ideas have consequences. Though he published only one small work during his life, and another published shortly after his death, his ideas endure to this day, influencing academics, political discourse, and social dynamics. His single idea "the meaning is the use," changed the course of philosophy, and pointed us toward our current "post-truth" culture of mistrust, doublespeak, and division. Wittgenstein's ideas contributed to the Loss of Trust in the 21st Century. As with any important philosopher, some scholars disagree with the "received view" of Wittgenstein that I have presented here, and argue for other interpretations. Even Wittgenstein himself may have disagreed with the culture's adaptation of his ideas, yet their cultural impact cannot be denied. In this paper I will argue the following points: 1. Philosophy matters! A single sentence can quite literally change the world. 2. One effect of the "Linguistic Turn" inspired by Wittgenstein is to confine philosophy to language, making the study of reality (metaphysics) much less fashionable and in some cases even rendering it impossible. 3. Language game theory, though very useful to describe our communication practices, can also produce an environment where words are reality, words are pliable, we begin to lose trust in language, and words quickly become weaponized. These three points show how our cultural, political, and scientific crisis of trust originates (at least in part) from the playing out of Wittgenstein's language game theory. I finally suggest a few ideas toward regaining trust.

<https://www.frontiersin.org/journals/communication/articles/10.3389/fcomm.2026.1862032/abstract>

Frontiers in Psychology**PAPERS****MARYANNE L. FISHER et al – Kill them with kindness: preliminary evidence for women's competitive altruism**

We developed the Competitive Altruism Survey (CAS) to test how intrasexual competition (i.e., competitive altruism) relates to Machiavellianism, Big Five personality traits, social desirability, and impression management.

A sample of 103 heterosexual cisgender women aged 18 to 45 years completed an online survey. Results: Competitive altruism was strongly and positively related to Machiavellianism and negatively related to Agreeableness and was more used when directed at other women than at men. Neuroticism was correlated with anxiety and frustration that accompany strategic kindness, rather than to competitive altruism. Correlations with impression management and social desirability were unexpectedly negative; this pattern is open to several readings, one being openness about strategic intent. Open-ended responses converge with this interpretation, with women describing the strategic kindness they observe in others as occurring within workplace hierarchies, in publicized or social-media display, and in warmth that contradicts itself in private. Our results offer preliminary self-report evidence, in a predominantly Western online sample, that women may use competitive altruism and generosity as strategies to gain a reputation in competition.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2026.1924479/full>

iScience**PAPERS****KOSTAS HADJIDIMITRAKIS et al – Behavioral states affect eye position tuning in the parietal cortex of macaques**

Posterior parietal neural populations compute flexible yet stable representations of spatial locations using eye position information, and plan effector movements across various goal-directed contexts. How space is represented during internally driven non-goal-directed behaviors and whether these spatial representations are affected by the different behavioral contexts and the underlying brain states remain understudied. We compared eye position signals in single neurons in macaque parietal cortex (area V6A) during constrained fixations toward visual targets with gaze activity during self-paced fixations in darkness. While the firing rates of V6A neurons were comparable in the two conditions, the spatial tuning of gaze activity was stronger during the spontaneous fixations than during task-constrained fixations. Moreover, neural responses were more variable in constrained fixation. Our results confirm the flexibility of spatial representations in parietal cortex and indicate that eye position signals provide spatial information in a wider range of behavioral contexts beyond visual and visuomotor processing.

[https://www.cell.com/iscience/fulltext/S2589-0042\(26\)02837-3](https://www.cell.com/iscience/fulltext/S2589-0042(26)02837-3)

Nature**NEWS****Who were the Denisovans? Rich trove of fossils and tools paints new picture**

Objects found in a cave in southwestern China suggest that these enigmatic ancient humans were accomplished hunters.

<https://www.nature.com/articles/d41586-026-02810-z>

PAPERS**HUIYUN RAO et al – Ancient proteins identify various Denisovan remains from Southwest China**

More than a decade of multidisciplinary research has identified a collection of cranial, facial and dental remains of Denisovans from across Asia, providing insight into their cranial capacity, appearance, diet and evolutionary history. However, our understanding of their spatiotemporal dispersal and morphological phenotype is limited by a conspicuous distribution gap in Southwest China and the scarcity of postcranial remains, in particular, the absence of long bones with diagnostic characteristics. To identify further hominin long bones, we morphologically screened more than 60,000 bone fragments from Bianfu Cave in Southwest China, of which 76 were selected for zooarchaeology by mass spectrometry and 17 for proteomic sequencing analysis. These analyses identified three hominin fossils, comprising two parietal bone fragments and one proximal radial fragment, from layers dated to approximately 167–134 thousand years ago¹. Subsequent proteomic analysis confirmed the taxonomic affiliation of these newly identified hominin bones, as well as that of two hominin teeth discovered during the excavation, as Denisovan. These findings establish Bianfu Cave as a Denisovan locality yielding the most abundant remains of this hominin group outside Denisova Cave in Siberia. The results also fill a critical geographic gap in the documented distribution of Denisovans and refine our understanding of their evolutionary history. Furthermore, this study provides direct information on the radial morphology of Denisovans, providing insight into their postcranial phenotype.

<https://www.nature.com/articles/s41586-026-10976-9>

QIJUN RUAN et al – Denisovans from southwestern China and their subsistence strategies

Growing fossil and genomic evidence has substantially advanced our understanding of Denisovans' evolutionary history, yet their technological behaviours and subsistence strategies remain poorly documented. Here we present a comprehensive analysis of hominin fossils and associated archaeological remains from Bianfu Cave, Yunnan Province, southwestern China.

The hominin fossils are dated to about 167–134 thousand years ago (ka), whereas the cultural sequence spanned from about 190 ka to 70 ka, representing one of the longest cultural records most parsimoniously attributed to Denisovans—identified through enamel–dentine junction morphology and palaeoproteomic analyses. The new fossils include four teeth that expand the known dental variation of this group, two cranial fragments and a radius. Faunal and pollen records indicate a conifer-dominated forest or forest-steppe environment across Marine Isotope Stages 6 to 4. The inhabitants of Bianfu Cave practised specialized hunting of medium- to large-bodied prey and used a technological strategy characterized by expedient core reduction and tool production, alongside pervasive use of unmodified bones. This pattern suggests an adaptive system prioritizing the exploitation of object affordance over intensive tool manufacture. Bianfu Cave provides unprecedented insights into Denisovan biology, behaviour and ecology in eastern Asia and points to a substantial genetic and cultural legacy in later populations in Southeast Asia and Oceania.

<https://www.nature.com/articles/s41586-026-10997-4>

Nature Africa

ARTICLES

ELSABE BRITS – Ancient tooth proteins deepen the Homo naledi mystery

South African molecular scientist Palesa Madupe expected proteins preserved in fossil enamel to clarify why *Homo naledi* remains look so alike. Instead, teeth from at least 20 individuals yielded no male protein markers.

<https://www.nature.com/articles/d44148-026-00224-7>

Nature Genetics

ARTICLES

PETRA GROSS – Tracing ‘ghost’ ancestry in modern humans

The sequences of Neanderthal and Denisovan genomes have provided crucial insights into human evolution and suggest gene-flow events between archaic and modern hominins. However, other, unknown ‘ghost’ hominins might have existed without leaving a genomic record. Priya Moorjani and colleagues developed a method (termed TRACE) for identifying footprints of archaic ancestry in modern human genomes that leverages features of ancestral recombination graphs constructed from contemporary genomes alone without the need for an archaic reference genome. Applying this approach to sequences from the 1000 Genomes Project allowed reconstruction of the major features of Neanderthal and Denisovan introgression across global populations and, interestingly, also revealed ‘ghost’ archaic ancestry in modern human populations, including in Neanderthal and Denisovan ancestry deserts, thus challenging their notion as *Homo sapiens*-specific regions. Moreover, Oceanian genomes were found to be enriched in super-archaic tracts within regions that are relevant for MHC immune function and vitamin D metabolism, pointing to an additional, indirect introgression event. Further studies are needed to narrow down the timing and location of these introgressions and delineate their functional consequences within human evolution.

<https://www.nature.com/articles/s41588-026-02759-9>

Nature Scientific Reports

PAPERS

MARLEN KÜCKLICH et al – Multimodal fertility cues in chimpanzees: how body odours complement sexual swellings

To attract mating partners, female mammals communicate their reproductive status through one or multiple sensory modalities, providing redundant or complementary information. Chimpanzees (*Pan troglodytes*) are an excellent model for studying multimodal communication. Exaggerated sexual swellings of females serve as visual proxy for ovulation but their temporal imprecision suggests that olfactory cues may exist in addition to swellings to pinpoint fertility more accurately. Here, we combined gas chromatography–mass spectrometry, hormonal analyses, and two-choice sniffing bioassays to examine (1) whether female anogenital odours change during the fertile period, and (2) whether males are able to detect these changes by odours alone. Our chemical results suggest that complementary changes in chemical profiles linked to menstrual cycle phases exist in addition to prominent changes of anogenital odours associated with swelling stages, even if they are statistically less strongly supported. Male responsiveness in behavioural bioassays was too low to draw conclusions regarding their ability to detect these subtle shifts when presented with anogenital odours only. Overall, our chemical analyses of female anogenital odours suggest the existence of a multimodal fertility cue in chimpanzees, wherein visual signals seem to be complemented by subtle changes in odours’ chemical profiles associated with menstrual cycle phases.

<https://www.nature.com/articles/s41598-026-70687-z>

New Scientist

NEWS

Pygmy raccoons teach each other to make toys out of paper and sand

Critically endangered pygmy raccoons on Cozumel Island in Mexico have shown remarkable creativity by making balls out of rubbish at beach clubs.

<https://www.newscientist.com/article/2587479-pygmy-raccoons-teach-each-other-to-make-toys-out-of-paper-and-sand/>

ARTICLES

MICHAEL MARSHALL – Denisovan tools from cave in China show how mysterious humans lived

A site in China is just the third to give us an insight into the way the enigmatic Denisovans lived. The archaeology at the site suggests the ancient humans were skilled hunters, although their stone tools were relatively simple.

<https://www.newscientist.com/article/2588304-denisovan-tools-from-cave-in-china-shows-how-mysterious-humans-lived/>

REVIEWS

MICHAEL MARSHALL – fascinating deep dive into the real Vikings

The stories we tell about the Vikings often say more about us than them. Archaeologist Neil Price's new book *The Sea-King and the Sorceress* tries to show the Norse as they were.

Review of 'The Sea-King and the Sorceress' by Neil Price, Allen Lane (UK) Basic Books (US) (2026).

<https://www.newscientist.com/article/2587902-new-scientist-recommends-a-fascinating-deep-dive-into-the-real-vikings/>

NPJ Heritage Science

PAPERS

SIMON RADCHENKO et al – Internal structure of Mammoth ivory inspired the design of Mizyn (Ukraine) Upper Palaeolithic figurines

We're sharing this article early to provide faster access to peer-reviewed, accepted research. It is citable and carries a permanent DOI. This version is subject to further edits and will be replaced automatically by the final Version of Record. All legal disclaimers apply.

This paper presents the results of digital and microscopic analysis of 18 ivory figurines from Mizyn, Ukraine. Digital preservation has enabled the first detailed technological analysis of these rare artefacts. Results reveal new insights into the symbolism of ivory as a material essential to the creative process. Palaeolithic artists used Schreger and Owen's lines, the natural patterns within mammoth ivory, to inform the geometric compositions engraved on many of the figurines. This link between engraved and naturally occurring patterns has wider implications for understanding art production elsewhere. Additionally, we present generalisation of recalibrated radiocarbon dates for contexts containing figurines from other European Palaeolithic sites, which place the Mizyn figurines amongst the earliest anthropomorphic images known in Europe post Last Glacial Maximum. Results suggest that these artefacts represent an independent stylistic phenomenon in the chronology of art-style development during the Palaeolithic period.

<https://www.nature.com/articles/s40494-026-02988-5>

Proceedings of the Royal Society A

PAPERS

ANTHONY CLARKE, JIM LEARY & CHRIS KIRKLAND – Deliberate prehistoric sourcing of the Devil's Arrows, Britain's tallest stone row

How prehistoric societies selected and transported megaliths remains poorly understood because the geological sources of many monuments are unresolved. The approximately 7 m tall and 25-tonne Devil's Arrows are Britain's tallest surviving standing stone alignment, yet their provenance remains disputed. Here, we use detrital zircon–apatite U–Pb age fingerprints, including Lower Palaeozoic, Mesoproterozoic and Archean ages, to link the Arrows to striking Millstone Grit outcrops at Brimham Rocks, 18 km to the west. Regional ice-flow reconstructions exclude glacial transport from Brimham, whereas shared surface weathering and potential cup-and-ring rock art further link the Arrows to this source landscape. Our results demonstrate the purposeful extraction and transport of megaliths from a specific, geomorphologically distinctive upland source rather than the opportunistic use of local stone. This evidence indicates that megalith selection reflects deliberate engagement with particular landscapes, linking monument construction to both place and engineering.

<https://royalsocietypublishing.org/rspa/article/482/2345/20260504/483254/Deliberate-prehistoric-sourcing-of-the-Devil-s>

Proceedings of the Royal Society B

PAPERS

EMILIE RAPPORT MUNRO et al with JOSEP CALL – Chimpanzees attribute agency to virtual animals, but not to self-propelled shapes

Discriminating agents from inanimate objects is essential for predicting others' behaviour. Although chimpanzees (*Pan troglodytes*) differentiate between agents and objects, the cues underlying this ability remain unclear. We investigated chimpanzees' agency attribution using a virtual-environment paradigm in which they interacted with four competitors varying in two putative agency cues: self-propulsion and animal-like morphology. We measured facial, vocal and gestural emotive responses directed at these competitors as behavioural markers of agency attribution. Chimpanzees showed clear evidence of attributing agency. The effect of self-propulsion was not significant, but there was a strong effect of morphology: subjects responded more strongly to animal-shaped virtual competitors than to geometric shapes. This pattern resembles

that shown by human infants and adults: they, too, identify entities with animal features as agents, but self-propelled movement without cues of internal control is not enough to denote agency for these populations. These converging results point to a shared, morphology-based mechanism guiding agentic responses in chimpanzees and humans.

<https://royalsocietypublishing.org/rspb/article/293/2078/20261574/483250/Chimpanzees-attribute-agency-to-virtual-animals>

Royal Society Open Science

PAPERS

STAV SUBACH et al – Using computer games to explore foraging-predation trade-offs and spatial learning in humans

Foraging requires organisms to balance energetic gains against multiple costs, including predation risk, while updating decisions as conditions change. Although these processes are well studied in animals, ecologically grounded paradigms for testing behavioural updating and cross-task generalization in humans remain limited. We developed two computer-game assays inspired by animal foraging research to examine how humans adjust behaviour under simulated predation risk, whether prior risk exposure affects later decisions and whether spatial performance generalizes across tasks. Participants completed a central-place open-field foraging task under safe and risky conditions and a maze-navigation task assessing spatial learning. Predation risk reduced foraging effort and increased hiding behaviour. Behavioural responses also depended on task order: individuals exposed to risk first showed attenuated shifts across contexts, indicating carryover effects and incomplete updating of environmental state. Spatial performance generalized across tasks under both safe and risky contexts. In the maze task, performance improved across trials with a negatively accelerated learning curve, consistent with spatial learning dynamics. These findings show that ecologically grounded computer games can reveal imperfect updating under changing risk while providing a controlled framework for studying human decision-making under ecological constraints.

<https://royalsocietypublishing.org/rsos/article/13/9/rsos260389/483222/Using-computer-games-to-explore-foraging-predation>

Science Advances

PAPERS

ADAM BRUMM et al – Betel nut sucking is the earliest recorded evidence for the habitual use of a neuroactive plant drug

The modern custom of chewing betel nuts is practiced by around 1 in 10 people worldwide, yet the earliest beginnings of this widespread drug use habit are unknown. We report rare skeletal remains of two preagricultural foragers from Sulawesi (Indonesia), both displaying a dental pathology that we establish was caused by a hitherto unknown precursor to betel chewing: habitual sucking of whole betel nuts. Previous reports suggested that the main neuroactive alkaloid in betel nut, arecoline, is released by masticating the processed nut with slaked lime. However, our experiments demonstrate that simply keeping intact betel nuts in the oral cavity for prolonged periods releases arecoline. Biomolecular analysis of the ancient human teeth is also consistent with this early form of ingesting betel nut. With the earliest forager dating to 25 to 16 thousand years ago, our findings suggest the use of betel nut as a drug has more ancient origins than previously supposed.

<https://www.science.org/doi/10.1126/sciadv.aei1901>

Trends in Cognitive Sciences

PAPERS

JAKE QUILTY-DUNN & JUSTIN N. WOOD – The nativist–empiricist debate is broken

The nativist–empiricist debate has long organized cognitive science, framing cognitive mechanisms as either innate or learned. Recent advances in controlled rearing and scalable domain-general neural networks now allow this debate to be tested with unprecedented rigor, by raising newborn animals and deep neural networks under tightly matched developmental conditions. Strikingly, when pushed to this empirical limit, the debate does not resolve: the same developmental phenomena support both radical empiricism and radical nativism. We argue that this stalemate reflects a conceptual error. The debate conflates explanatory levels and ontological orientations, with nativists emphasizing stable symbolic structures and empiricists emphasizing the subsymbolic processes that produce those structures. We propose dissolving the dichotomy within a multilevel framework of cognitive development.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(26\)00185-3](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(26)00185-3)

OSHIN VARTANIAN et al – Valuation as a bridge between aesthetics and creativity

Evidence shows that aesthetic evaluations are underpinned by mechanisms in the reward system that compute value for objects of interest. In turn, recent behavioral, computational, and neuroimaging evidence suggests that creativity involves a similar valuation process, as people generate and evaluate the originality and adequacy of their ideas—two standard criteria of creativity. These findings suggest that creativity and aesthetic evaluation may be supported by a domain-general mechanism for computing subjective value. We offer a proposal in which creators' value computations are conveyed by the structure and content of their works and recovered during aesthetic evaluation through shared reward-system mechanisms

and associated processes. On this view, creating and appreciating are two related expressions of a shared value-based process.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(26\)00186-5](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(26)00186-5)

Trends in Genetics

PAPERS

R. ALEXANDER PYRON & TIMOTHY J. COLSTON – Hologenomic interactions promote the higher-order evolvability of phenotypic complexity

Current models for evolvability and complexity generally focus on mutational and regulatory processes in the host genome alone, limiting their ability to explain the origin, inheritance, and dynamics of many phenotypes. We describe a framework treating multigenome interactions in the holobiont as a central process that impacts the genotype–phenotype map, expanding the dimensionality of mechanisms producing heritable variation, generating novel traits, and exploring adaptive trajectories. These mechanisms can promote both complex phenotypic innovation and evolutionary systems drift. Many evolutionary pathways and novelties cannot be fully understood from host data alone but require consideration of hologenomic targets of selection. We outline hypotheses and methods to quantify and evaluate their impacts as a fundamental macroevolutionary process.

[https://www.cell.com/trends/genetics/fulltext/S0168-9525\(26\)00214-3](https://www.cell.com/trends/genetics/fulltext/S0168-9525(26)00214-3)

Trends Open

PAPERS

EVA JABLONKA & SAMUEL R. COHEN – Aphantasia and the evolution of language

Based on findings about congenital aphantasia and a functional characterization of language as an evolved ‘technology’ for the instruction of imagination, we propose a novel approach to the evolution of language. We argue that language imposed metabolic costs and created emotional vulnerabilities. Selection for the partial suppression of ancestral, hypervivid, imagery-based, and emotionally charged recall partially mitigated these costs. Congenital aphantasia is hypothesized to represent an extreme manifestation of this linguistic suppression, hyperoptimizing the manipulation of semantic and syntactic protocols by actively bypassing metabolically and emotionally expensive visual-recall processing. This extreme specialization, which itself has costs, may, however, have conferred advantages for abstract symbol manipulation needed for the cultural evolutionary transition from literal pictographs to abstract, symbol-based writing.

[https://www.cell.com/trends-open/fulltext/S3117-3470\(26\)00112-4](https://www.cell.com/trends-open/fulltext/S3117-3470(26)00112-4)

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