EAORC BULLETIN 1,195 – 10 May 2026

CONTENTS

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 – Pagans vs. Christians: The hidden face of the word 'Candlemas'

An Essay in Diachronic Cultural Linguistics Concerning a Secret Buried for More than 1200 years: The Hidden Face of the Word 'Candlemas' (2026?).

ROSLYN FRANK – Pagans vs. Christians: The hidden face of the word 'Candlemas'

Over the past twenty years I have collected and published substantial ethnographic evidence for the belief that Europeans once believed humans descended from bears. I first came across this belief nearly forty years ago in an article by the Basque anthropologist Txomin Peillen. In 1986 the belief was still alive as documented in Peillen's interview with two of the last Basque speaking bear hunters of Zuberoa (Soule). Subsequently, it became clear to me that there was abundant additional ethnographic evidence for this belief in the rest of Europe. Moreover, these survivals appear to be closely connected to and influenced by a pan-European folktale that talks about a young woman going into the woods and encountering a bear. The couple lives together and the human female give birth to a child, a boy who because of his mixed heritage is half-bear and half-human.

The more I worked with these materials, the more I suspected that with the introduction of Christianity, the two narratives must have come into contact and even conflict. At the same time, it is evident that when compared to the basic tenets of Christianity, the ursine ancestry is rooted in a much older hunter-gatherer mentality, an ontology that sets up no opposition between humans and animals. Hence, we are talking about a belief not founded on the concept of human exceptionalism. Obviously, if you believe that bears are your ancestors, you are already part of Nature, not standing outside and apart from it.

As more evidence accumulated, it became increasingly apparent to me that as Christianity was introduced, the hybrid ancestry of the bear's son must have allowed him to be viewed as the ursine equivalent of Jesus Christ, the Christian intermediary, whose immaculate birth is a centerpiece of Christian belief: his mother was a human female miraculously impregnated by the Holy Spirit. Even though it had occurred to me that the Christian authorities were aware of the two belief systems and had recognized that the belief in the ursine genealogy would need to be countered in some fashion, it was not until I began looking into the odd etymology of the word Chandeleur, the French term for Candlemas, that I began to figure out what had happened.

https://www.academia.edu/164864572/Pagans_vs_Christians_The_Hidden_Face_of_the_Word_Candlemas_

NEWS

NATURE BRIEFING – No such thing as photographic memory

"Belief in photographic memory is common and the idea is compelling," says memory researcher Gabrielle Principe. "But it is simply wrong." The closest thing to most people's concept of 'photographic memory' is eidetic imagery: a rare ability seen mostly in children, in which people say they can recall a long-studied image — but the mental picture isn't perfect, and soon fades. "The brain is not a roll of film, it's a storyteller," writes Principe. And that's a good thing: forgetting is an essential process that doesn't get bogged down in the details, dulls the pain of negative experiences and helps to maintain your sense of self, as you are now.

https://theconversation.com/photographic-memory-is-a-myth-heres-what-research-really-says-about-remembering-278160

NATURE BRIEFING – Anaesthetized people can process words

A deep brain structure called the hippocampus can learn and process language even when a person is under general anaesthesia. A probe that can record the activity of individual neurons in real time detected the region responding to the speech in a podcast and learning how to differentiate different tones. That doesn't mean anaesthetized people are 'secretly awake' — just that this one structure, the hippocampus, computes and integrates information even under anaesthesia, says cognitive neuroscientist Martin Monti.
https://www.nature.com/articles/d41586-026-01465-0

NATURE BRIEFING – We can dream-learn — but should we?

Evidence is growing that some people can listen, respond and learn — all while asleep and dreaming. For example, a study of lucid dreamers — who are sometimes aware that they're dreaming — prompted them to try to solve certain puzzles in their sleep when they heard a sound. When awake, they were more likely to figure out the puzzles that they'd seen in dreams than the ones they hadn't. But just because we can work while asleep doesn't mean we should. "Sleep has its own universe, and we should better use that moment for what it's good for," says sleep neuroscientist Thomas Andrillon.
https://academic.oup.com/nc/article/2026/1/niaf067/8456489

NEW SCIENTIST HUMAN STORY – A lost ancient script reveals how writing as we know it really began

A long-overlooked writing system from 5000 years ago is still largely undeciphered, but could mark the moment humans first represented their speech with written words.
https://www.newscientist.com/article/2524042-a-lost-ancient-script-reveals-how-writing-as-we-know-it-really-began/

SCIENCEADVISER – Early humans took dinner to-go

If you want chicken or steak for dinner, chances are you go to your nearest grocery store to select the right cut—or perhaps you order takeout. New research shows early humans were similarly choosy, picking limbs that had more meat and taking them to-go.

To study early hominids' meat-eating behaviors, researchers turned to a 1.6-million-year-old fossil assemblage in Kenya. They analyzed more than 1100 fossils from hoofed mammals, as well as hominid teeth, finding cut marks in spots aligned with large muscle groups, where the bones would have had more meat. They also saw repeated strikes that were likely used to crack open a bone for marrow, as well as few teeth marks from other carnivores, which suggests that we weren't munching on leftovers from other creatures' meals.

Interestingly, the bones at the site were mostly limbs and heads, rather than full bodies. That led the researchers to believe that ancient hominids were taking desired parts of the animal and transporting them to other locations for eating, perhaps due to competition from other predators.

"Understanding early human foraging is important because it shows how our ancestors dealt with real survival problems," lead author Frances Forrest told Gizmodo. "They had to find food, avoid danger, compete with other animals, and adjust when conditions changed. Those are not small details. They are part of the story of how humans became so adaptable."
https://www.pnas.org/doi/abs/10.1073/pnas.2537631123

SCIENCEADVISER – Cave high in the Pyrenees may have been a prehistoric mining camp

Archaeologists have long assumed that prehistoric people spent little time at high altitudes, only occasionally passing through the mountains on their way to more hospitable destinations. Items recovered from a cave high in the eastern Pyrenees, however, are challenging that assumption.

Humans appear to have repeatedly visited Cave 338, which is located more than 2000 meters above sea level and only accessible on foot from the Núria Valley in Spain, between 5th millennium B.C.E. and the end of the 1st millennium B.C.E. These ancient travelers weren't just using the cave as a pit stop: Archaeologists who excavated the site uncovered the remains of 23 hearths containing crushed, burnt fragments of a green mineral that resembles malachite. Since smelting malachite can produce copper, the team notes in a new study, Cave 338 may have served as a prehistoric mining camp . Researchers also discovered a child's finger bone and a baby tooth, which could mean that burials are hidden deeper in the cave, as well as two pieces of jewelry—one made from a clam shell and the other from the tooth of a brown bear.

The site "forces us to rethink the role of high mountain environments in Pyrenean prehistoric societies," lead study author Carlos Tornero said in a statement. "For a long time, these spaces were assumed to be marginal. What we document here is recurrent occupation, with complex activities and a clear exploitation of mineral resources."
https://www.frontiersin.org/journals/environmental-archaeology/articles/10.3389/fearc.2026.1811493/full

SCIENCEADVISER – Unconsciously aware

People under general anesthesia aren't completely oblivious to the world around them. Deep in their brains, a structure called the hippocampus remains alert, researchers have found. Though they cannot remember or feel pain, they can parse

spoken phrases and even predict what someone will say next. “The brain has developed such amazing, sophisticated mechanisms for doing all these complex tasks all day long, that it can do some of these things even without us being aware,” one expert said.
https://www.nature.com/articles/d41586-026-01465-0

SCIENCENEWS – Neandertals used rhinoceros teeth as tools

Finds at sites in Spain and France suggest that Neandertals used the teeth of ancient rhinos for heavy-duty fabrication.
https://www.sciencenews.org/article/rhino-teeth-neandertal-tool

PUBLICATIONS

Cell

PAPERS

JIAMING LI et mul – Multimodal clocks of human aging

Human aging is characterized by complex structural and functional decline, but quantifying its heterogeneity and assessing biological age remain challenges. We present the mCAS (multicentric Chinese aging standardized cohort) developed from 2,019 Chinese individuals aged 18–91 years. Integrating high-dimensional clinical, physiological, and molecular-level data, we constructed a three-tiered aging framework: the core capacity clock (CC-clock) to quantify clinical physiological decline, the multimodal clock (MM-clock) with extensive parameter coverage and enhanced predictive precision, and organ-associated aging clocks. Cross-layer analysis demonstrates that plasma protein clocks not only capture chronological age but also serve as efficient proxies for systemic physiological capacity. Leveraging this framework for discovery, we identified the age-dependent accumulation of coagulation factors as a driver of multi-organ senescence and systemic inflammatory activation. This study provides a foundational framework that bridges molecular signatures with functional decline, identifies new biomarkers for aging assessment, and reveals a novel translational driver of aging.
https://www.cell.com/cell/abstract/S0092-8674(26)00460-5

Evolutionary Anthropology

PAPERS

DANIEL BIGGS, BRAEDON FARKAS & BERNARD WOOD – Expanding Homo erectus

We focus on three researchers—Davidson Black, Franz Weidenreich and Ralph von Koenigswald—who have made major contributions to the recovery of the fossil record of the hominin taxon now known as Homo erectus. Black was responsible for the recognition of Sinanthropus pekinensis and for the recovery of the initial hypodigm from Choukoutien*. Almost all of the original S. pekinensis fossils were lost during the Second World War, but the precise documentation and meticulous descriptions prepared by Franz Weidenreich substantially mitigate their loss. An earlier article in this series focused on Eugène Dubois’ recovery of the type specimen of Pithecanthropus erectus from Trinil in Java, and while a few additional specimens from Trinil were recognized, the majority of the Javan hypodigm of P. erectus was recovered thanks to initiatives led or encouraged by Ralph von Koenigswald.
https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.70031

Frontiers in Cognition

PAPERS

DON A. AFFOGNON – Beyond the left-right brain divide: a framework for dual-domain cognitive fluency

Longstanding distinctions between “verbal” and “mathematical” minds continue to shape educational assessment, curriculum design, and how learners are categorized by perceived cognitive strengths. Yet plenty of evidence from psychology and cognitive neuroscience points to a more unified model of intelligence that refutes the false dichotomy. In this article, I propose dual-domain cognitive fluency (DDCF) as a way to describe how the human mind can move fluidly between words and numbers and derive meaning from both. Building on research in symbolic cognition, executive function, and cognitive flexibility, this article identifies three dimensions: symbolic translation between modalities, cognitive flexibility across task demands, and layered reasoning, which integrates propositional logic with linguistic abstraction. DDCF captures the symbolic agility now required in knowledge-based environments where the integration of representational systems matters more than isolated domain expertise. Examples range from data storytelling in journalism to algebraic modeling in the social sciences—contexts in which verbal and quantitative reasoning operate in tandem. These insights matter for pedagogy, curriculum design, and the evolving demands of data-intensive workplaces. Far from a niche ability, dual-domain fluency reflects a generalizable cognitive capacity that existing models of intelligence have struggled to measure, reward, or systematically support.
https://www.frontiersin.org/journals/cognition/articles/10.3389/fcogn.2026.1727422/full

Frontiers in Ecology and Evolution

PAPERS

CARLOS TORNERO et al with EUDALD CARBONELL – Beyond 2,000 meters, first evidence of intense prehistoric occupation in the Pyrenees

Cave 338 is a high-altitude prehistoric site located at 2,235 m a. s.l. in the eastern Pyrenees (Queralbs, Girona, NE Iberian Peninsula). Excavated between 2021 and 2023, the site preserves an exceptional and well-stratified archaeological sequence documenting recurrent episodes of human occupation spanning from at least the early 5th millennium cal BC to the late 1st millennium cal BC. Radiocarbon dates indicate that these occupations occurred during several discrete phases separated by intervals of reduced or absent activity. The cave currently represents the highest-altitude prehistoric cave site with sustained occupation currently documented in the Pyrenees. The archaeological record reveals a dense succession of combustion features, abundant faunal and ceramic remains, and an extraordinary assemblage of green mineral fragments, most likely malachite, repeatedly introduced into the cave and processed in situ. This evidence indicates the systematic exploitation of copper-rich minerals in a high-mountain environment from the Late Neolithic to the Bronze Age, providing an unprecedented record for the Pyrenean range and one of the earliest high-altitude contexts of mineral exploitation documented in Europe. The organization of space, the density of combustion features and the nature of the associated activities indicate that Cave 338 was not a marginal or sporadically used shelter, but rather a repeatedly occupied logistical site integrated within structured seasonal mobility systems. These findings challenge prevailing interpretative models that characterize prehistoric occupations above 2,000 m.a.s.l. as ephemeral and low-intensity. Instead, Cave 338 demonstrates that alpine environments could play a central role in long-term prehistoric land-use strategies, particularly in relation to the exploitation of mineral resources. As such, the site provides a key reference framework for understanding high-mountain occupation, resource exploitation and mobility dynamics in the Pyrenees during later prehistory.
https://www.frontiersin.org/journals/environmental-archaeology/articles/10.3389/fearc.2026.1811493/full

Frontiers in Environmental Archaeology

PAPERS

EVA FRANCESCA MARTELLOTTA et al with FRANCESCO D'ERRICO – From edge to mark. Investigating the relationship between cut marks and lithic raw materials

Understanding the relationship between animal processing practices and stone tool use is essential for interpreting Paleolithic lifeways. These activities leave behind two key forms of archaeological evidence: butchery marks ("cut marks") and lithic tools. While both faunal and lithic remains are critical to understanding past behaviors, they are rarely studied in an integrated framework. In particular, the characterization of cut marks produced by tools made from different raw materials remains underexplored. This study presents an experimental protocol designed to address this gap by establishing a baseline for identifying cut marks created using dacite, flint, and obsidian tools. Both retouched and unretouched edges were used in controlled cutting actions on bone. The results show that the different raw materials exhibited varying degrees of cutting performance. However, statistical analyses of the resulting cut marks revealed limited patterns that could reliably distinguish between raw material types. These findings highlight the need for more refined analytical approaches capable of linking cut mark features to specific tool types or materials. Such advancements hold significant potential for regions as the southern Caucasus, where diverse raw material use and reduction strategies complicate the interpretation of butchery practices.
https://www.frontiersin.org/journals/environmental-archaeology/articles/10.3389/fearc.2026.1738188/full

Frontiers in Human Neuroscience

PAPERS

TEAGAN ESME ESTHER, LIRON SHLESINGER & FERNANDO LLANOS – The effects of vocal emotions and emotional context on the neural tracking of speech envelopes and listeners' vigilance states

High-arousal emotional speech, such as angry and happy speech, is characterized by changes in signal amplitude that can substantially alter the temporal structure of the speech signal. In this EEG study, we investigated how these acoustic changes, and the structure of the preceding emotional context, influence neural tracking of temporal speech patterns, as well as alpha-band desynchronization associated with vigilance states in listeners.

EEGs were recorded from 30 adult native speakers of American English while they listened to angry, happy, or neutral spoken sentences presented either in a randomized order or blocked by emotion. To ensure sustained attention, participants answered occasional questions about sentence content.

Angry speech elicited stronger alpha desynchronization than neutral and happy speech when stimuli were blocked by emotion but not when stimuli were fully randomized. In contrast, neural tracking of amplitude modulation patterns was more robust for neutral speech compared to happy or angry speech across both stimulus presentation contexts. When neural tracking was controlled for stimulus differences in amplitude variability, angry speech, which conveyed greater amplitude variability, was more faithfully tracked than both happy and neutral speech across stimulus presentation contexts. Our findings suggest that tonic modulations of alpha power are more sensitive to prolonged emotional context than to transient changes in speaker emotion. Furthermore, we found that emotional speech robustly modulates listeners' vigilance,

particularly following prolonged exposure to a single emotion, while exerting a limited influence on the neural encoding of amplitude modulation, which is primarily dominated by bottom-up amplitude variability in the acoustic signal.
https://www.frontiersin.org/journals/human-neuroscience/articles/10.3389/fnhum.2026.1692628/full

Frontiers in Language Sciences

PAPERS

DIEGO GABRIEL KRIVOCHEN, DOUGLAS SADDY & JULIE FRANCK – The architecture of agreement: from strings to structures

In this paper we raise the question “why is agreement so common across natural languages?”. We will argue that the challenge of grammar inference in natural and artificial languages provides key insights into the ubiquity of agreement. By grammar inference, we mean the discovery of a procedure that (i) determines string well-formedness on the basis of exposure to unannotated expressions of a language; and (ii) allows for the construction of structural descriptions for well-formed strings. The idealized version of this problem results in the identification of the generator of a stringset, or -more realistically- a restriction of the class of possible generators. We argue that agreement plays a crucial role not only in flagging dependencies between expressions at the string level, but also, considering that agreement relations occur in restricted structural configurations, in restricting the class of structural descriptions compatible with a string. As such, agreement mediates between strings and structure, providing a parser with information to solve the grammar inference problem. We will furthermore argue that the mechanisms involved in grammar identification are not restricted to natural language acquisition and processing, but in fact extend to a class of problems that motivated much research in the theory of symbolic encoding of dynamical systems and machine learning.
https://www.frontiersin.org/journals/language-sciences/articles/10.3389/flang.2026.1689620/full

Frontiers in Psychology

PAPERS

JUAN MANUEL GARCÍA-RUIZ et al – On the origin of our fascination with crystals

Crystals are fascinating structures of solid or liquid matter where atoms, molecules, and/or ions are, on average, arranged in a highly ordered lattice. It is well-documented that some of the earliest objects collected by our hominin ancestors, without evident practical purpose, were small quartz and calcite crystals. These crystals, measuring a few centimeters, had no known utility as weapons, tools, or ornaments. However, hominins appear to have appreciated these stones, collecting and transporting them from their place of discovery to their shelters. This behavior, registered as far back as 780,000 years ago, has been interpreted as early evidence of symbolic thought in much younger archaeological contexts. In this study, we adopted an experimental approach to investigate the factors underlying the nature of our ancestral fascination with crystals. We designed a series of experiments with enculturated chimpanzees, one of our two closest living nonhuman relatives, who share significant genetic and behavioral traits with humans. The experiments aimed to identify which physical properties of crystals might have attracted chimpanzees and hominins. Our results suggest that enculturated chimpanzees can identify and distinguish crystals from other types of stones. We found that transparency and geometric shape were the two attractors guiding chimpanzees. These properties are notably salient in the natural environments of both chimpanzees and hominins. Furthermore, the crystals elicited exploratory behaviors in the enculturated chimpanzees, who engaged in voluntary and intentional actions to investigate crystalline transparency and compare shape. We discuss the relevance of these findings for understanding hominin behavior, proposing that similar responses to crystals in hominins and non-hominin apes could reflect a shared cognitive predisposition. Our study provides insights into the potential role of crystal collection in cognitive evolution and highlights the significance of material properties in shaping early symbolic behaviors.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2026.1633599/full

Heliyon

PAPERS

JOHANNES RODRIGUES & JOHANNES HEWIG – Let's call it altruism! A psychological perspective and hierarchical framework of altruism and prosocial behavior

“Altruism” varies in its definition, even among researchers in the same field of research. This lack of common ground concerning the definition often leads to misunderstandings. In this work, we try to provide a “lay of the land” examination of the concepts prosocial behaviour and altruism used in the context of empirical research in psychology and propose a hierarchical model of prosocial behaviour that provides an overview of the hierarchical structure and position of definitions of altruism. Additionally, we implement two dimensions, tolerance for harm done to oneself or others and benefits to others or oneself, to systematize the different prosocial categories and definitory approaches on each hierarchical level. The hierarchical levels of our model include firstly helping behaviour (both voluntary and involuntary conduct benefitting others); secondly prosocial behaviour (voluntary helping, independent from one's reasons for helping); moreover and most importantly we debate different kinds of prosocial behaviour according to the source of general motivation; concepts from evolutionary perspectives; social exchange theory; situation-specific motivational aspects of prosocial behaviour and social interaction rules, as they all play important roles in the empirical research in psychology. We propose this model to offer

common ground for communication within our discipline and other disciplines, and to spread awareness of the hierarchical differences in the various definitions of "altruism" in diverse fields of research.
https://www.cell.com/heliyon/fulltext/S2405-8440(26)00341-5

Mind & Language

PAPERS

CHRISTIAN DE LEON – Conversational salience and mutual attention
The notion of conversational salience has proven useful for linguistic theorizing. Regardless of whether salience determines facts about meaning or merely aids in the communication of meanings, what is said is tied up with what is salient. I argue that the linguistic notion of salience is best understood in terms of the psychological notion of mutual attention. I discuss competing options and argue that only mutual attention suffices for establishing conversational salience in the way required by linguistic theory. The picture that emerges is one on which conversational moves function in part to coordinate the attentional states of interlocutors.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.70001

COMMENTARIES

FRANCESCO ANTILICI & YIFAN MEI – Knowledge before belief in non-human primates: A rebuttal
Several scientists and philosophers have argued that knowledge is more basic than belief, partly by appeal to evidence that non-human primates attribute the former but not the latter. We re-examine this evidence and argue that it is, in fact, more consistent with the presence of belief-attribution than its absence. We also highlight the benefits of belief-attribution and cast doubt on its alleged costs. While further research is needed to settle the debate, we recommend an attitude of cautious optimism: The understanding of the mind our close relatives possess may be more like ours than previously assumed.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.70002

HANNES RAKOCZY – Pettit psychologized = Vygotsky?
The main claim of When minds converse is that speaking a language enables new cognitive and practical capacities that radically transform the human mind. The book is a rich source of inspiration for developmental and comparative cognitive science. In this commentary, I discuss some of the questions that the book raises for cognitive scientists and wonder how its armchair genealogy could be psychologized.
https://onlinelibrary.wiley.com/doi/full/10.1111/mila.70032

DORIT BAR-ON – How do minds begin to converse?
After briefly providing a broad outline of Pettit's genealogical account of the emergence of distinctive human capacities from the capacities of imaginary prehuman ancestors—the "humanoids"—I articulate a specific worry concerning what Pettit takes to be the humanoids' starting point as they get on their journey toward acquiring a "human soul". This is the worry that the humanoids' starting point is not theoretically innocent.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.70009

RICHARD MOORE – Genealogy and cognitive development: On Pettit's When minds converse
I discuss three key differences between Pettit's philosophical genealogy and other influential works of cognitive development. They are: (i) concern with the temporal distribution of changes from a starting state A to the envisaged end state B, (ii) constraints on the specification of A and (iii) claims about the likelihood of the transition from A to B. I argue that legitimate concerns can be raised about Pettit's treatment of (ii) and (iii). Nonetheless, When minds converse proposes a series of original, compelling and empirically testable hypotheses about the role of conversation in cognitive development.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.70014

PHILIP PETTIT – Reply to commentators on When minds converse: A social genealogy of the human soul
This paper offers a brief overview of When minds converse followed by a characterization of each response and a consideration of some of the observations that it makes.
https://onlinelibrary.wiley.com/doi/full/10.1111/mila.70044

Nature

NEWS

Even the unconscious brain can learn — and predict what you'll say next
Neuronal recordings of people under anaesthesia show that their brains are processing words and sounds.
https://www.nature.com/articles/d41586-026-01465-0

PAPERS

KALMAN A. KATLOWITZ et al – Plasticity and language in the anaesthetized human hippocampus

Consciousness is a fundamental component of cognition1, but the degree to which higher-order pattern recognition relies on it remains disputed2,3. Here we demonstrate the persistence of oddball discrimination, semantic processing and online prediction in individuals under general-anaesthesia-induced loss of consciousness4,5. Using high-density Neuropixels microelectrodes6 to record both single-unit and local-field-potential neural activity in the human hippocampus while playing a series of tones to anaesthetized patients, we found that hippocampal neurons and local oscillations retained some detection of oddball tones. This effect size grew over the course of the experiment (around 10 min), demonstrating representational plasticity. A biologically plausible recurrent neural network model showed that learning and oddball representation are an emergent property of flexible tone discrimination. Moreover, when we played language stimuli, single units and local field potentials carried information about the semantic and grammatical features of natural speech, even predicting semantic information about upcoming words. Together these results indicate that in the hippocampus, which is anatomically and functionally distant from primary sensory cortices7, complex processing of sensory stimuli occurs even in the unconscious state.

https://www.nature.com/articles/s41586-026-10448-0

Nature Communications Biology

PAPERS

ARON KOSZEGHY & JOHANNES PASSECKER – Prefrontal modulation of striatal engagement: a hierarchical framework for goal-directed behavior

We review Prefrontal-striatum interplay in goal-directed behavior, focusing on prefrontal (PFC) and striatal macro- and micro-domain interactions in hierarchical engagement with goals, strategies and actions. This dual-control framework posits a role for the striatal matrix in engaging with behavioral options- for automatization, and prefrontal modulation of striatal engagement for flexibility. Hierarchical prefronto-basal-ganglia loops incorporating ventral-, dorsomedial-, and dorsolateral striatum represent goals, strategies and actions respectively. The striatal “switchboard” enables engagement, a unified function across macro-domains, while its modulation by PFC operates through dual mechanisms: fast switching via direct matrix inputs, and slower, learning-based adaptation using a striosome-dopamine pathway.

https://www.nature.com/articles/s42003-026-10047-9

Nature Ecology & Evolution

PAPERS

ODD T. JACOBSON et al – Environmental fluctuations alter the competitive trade-offs of group size in a social primate

Larger animal groups are widely understood to require more space and expend more energy to mitigate the foraging costs of within-group competition. Yet between-group interactions and shifting resource distributions can obscure links between group size and behaviour, making responses to demographic change difficult to predict. Here, using 33 years of observational data from 12 neighbouring white-faced capuchin (Cebus imitator) groups in Costa Rica, combined with remotely sensed environmental data, we show that within- and between-group competition jointly shape space use, with their relative importance shifting with seasonal and interannual climate cycles. Larger groups compensated for reduced per capita foraging efficiency by expanding into less-exploited areas over longer timescales rather than increasing daily travel. Notably, this expansion disproportionately encroached on smaller neighbouring groups. In the dry season, resource confinement to riparian zones increased intergroup encounters and reduced overlap, with larger groups occupying the highest-quality areas. Climatic extremes linked to El Niño and La Niña exacerbated within-group foraging costs for large groups, whereas intermediate anomalies relaxed these constraints and amplified the benefits of between-group competitive ability. Our findings show that environmental variation shifts the trade-offs of within- and between-group competition, shaping how group-living animals adjust to changing social and ecological conditions.

https://www.nature.com/articles/s41559-026-03048-8

Nature Humanities & Social Sciences Communications

PAPERS

GIULIO VIDOTTO – Plausibility, persuasion, and truth: why language models may appear designed to deceive

Large language models can produce fluent, coherent, and persuasive responses even when the information on which they rely is partial, contested, or false. In disputed domains, this may leave some users with the impression that they are being deliberately misled. This Comment argues that the phenomenon is better understood in structural than intentional terms. It results from the convergence of four features of current systems: optimization for plausibility rather than truth, post-training incentives that reward helpful and persuasive answers, structural hallucination, and source bias rooted in asymmetries of knowledge production and digitization. These structural tendencies are further reinforced at the point of uptake by cognitive vulnerabilities such as automation bias and fluency-based truth effects. Recent evidence on conversational persuasion suggests that gains in persuasive force may come at the expense of factual accuracy. The governance problem, then, is not primarily to infer intent, but to identify the mechanisms through which epistemic distortion is produced. This Comment

therefore proposes a minimal framework for epistemic auditing that distinguishes factual error, systematic omission, corpus bias, and post-training- or prompt-induced distortion, with a view to more discriminating oversight and clearer lines of responsibility.
https://www.nature.com/articles/s41599-026-07513-4

JIAXING JIANG & JIA LIU – An interdisciplinary perspective on the definition of evaluative meaning: what can linguistics learn from psychology and philosophy?
We are providing an unedited version of this manuscript to give early access to its findings. Before final publication, the manuscript will undergo further editing. Please note there may be errors present which affect the content, and all legal disclaimers apply.
Studies on evaluative meaning (EM) have a long history in the social sciences. Among these studies, linguistics has made significant contributions to describing the meaning and use of evaluative language. Nevertheless, distinct kinds of EMs in linguistic research overlap with each other. Although linguists have resorted to psychological and philosophical research to define different kinds of EMs, their conclusions cannot depict the relationships between those EMs. The key to identifying an interdisciplinary approach to this issue lies in comprehending current research trends and the influential theories in those two disciplines concerning the linguistic EM. Consequently, this study reviews the important and influential research on EMs shared by the three disciplines via bibliometric analysis. The co-citation analysis results indicate that psychological research, relevant to linguistic EM, primarily concerns whether EMs are generated automatically or consciously, while philosophical research, pertaining to linguistic EM, focuses mainly on the truth conditions of EM interpretation. Based on these results, we conclude two pairs of concepts (i.e., conscious vs. automatic and epistemic vs. ontological) that are likely to innovate linguistic methodology for analyzing EMs. In addition, owing to the existence of those concepts, two analytical perspectives (i.e., producer-analyst vs. addressee-analyst) are required in an interdisciplinary linguistic approach to defining linguistic EMs. The current study proposes a descriptive-explanatory perspective of linguistic EM research, which is beneficial for its definition and classification in the future.
https://www.nature.com/articles/s41599-026-07138-7

Neuron

PAPERS

JORDAN R. SHAKER et al – The midbrain reticular formation in contextual control of perceptual decisions
Flexibly responding to sensory cues is fundamental to animal behavior. However, growing evidence suggests that the relevant neural circuits have been incompletely resolved. We trained mice to apply an abstract rule that maps identical visual stimuli to opposing actions across contexts and investigated the role of the midbrain reticular formation (MRF) in this process. Large-scale recordings revealed that neurons in the MRF, along with several canonical decision-making areas, maintained persistent representations of task context in pre-stimulus activity. These representations predicted divergent population dynamics, putatively routing stimuli toward context-appropriate actions. The MRF was the only recorded region containing neuronal populations that both predicted lapses in contextual control pre-stimulus and exhibited contextually modulated premotor responses. The MRF also showed task-specific sensory plasticity. Context-coding neurons were aligned with cortical inputs, suggesting a spatial organization. These findings support the hypothesis that the MRF is a key node for setting and implementing abstract contextual states within the distributed circuitry for flexible perceptual decisions.
https://www.cell.com/neuron/abstract/S0896-6273(26)00272-2

New Scientist

ARTICLES

COLIN BARRAS – A lost ancient script reveals how writing as we know it really began
A long-overlooked writing system from 5000 years ago is still largely undeciphered, but could mark the moment humans first represented their speech with written words.
https://www.newscientist.com/article/2524042-a-lost-ancient-script-reveals-how-writing-as-we-know-it-really-began/

NPJ Heritage Science

PAPERS

REBEKA RMOUTILOVÁ et al – From bone to face: How different reconstruction frameworks influence the appearance of the Early Upper Paleolithic woman
We are providing an unedited version of this manuscript to give early access to its findings. Before final publication, the manuscript will undergo further editing. Please note there may be errors present which affect the content, and all legal disclaimers apply.
The Zlatý kůň (ZK) skull from Czechia dated to ~45 ka BP is a uniquely well-preserved specimen representing an early out-of-Africa population. Its preservation makes it ideal for facial approximation (FA), a compelling way to bring scientific insights to the public. Here we present three independent FAs of ZK—manual forensic, manual hyperrealistic, and virtual—compared both with each other and with extant European and African facial variation. Geometric morphometrics was used to quantify

differences in facial form and shape. All FAs fell within modern human variation with slightly more robust morphology reflecting the specimen's Upper Paleolithic context. The manual FAs—translating localized skeletal features more directly—align closely with African facial variation, whereas the virtual FA—constrained by deformation of a modern European reference template—exhibits a more gracile configuration. Our results underscore both conceptual differences influencing FA outcomes and the significance of visual reconstructions in communicating human origins.
https://www.nature.com/articles/s40494-026-02612-6

PLoS Biology

PAPERS

DAMIAN KOEVOET et al – Past and present goals are represented concurrently during visual search

Visual selection is often conceptualized as emerging from goal-, stimulus- and history-driven processes within spatial priority maps. Although extensive work detailed the interplay between goal- and stimulus-driven selection, it is largely unknown how goal- and history-driven processes jointly drive selection. While persistent neural firing likely underlies goal-driven selection, it is generally assumed that activity-silent mechanisms effectuate history-driven selection. Due to these different underlying neural mechanisms, simultaneously tracking goal- and history-driven influences neurally has proven difficult. We here employed EEG decoding techniques to simultaneously track and compare goal- and history-driven influences on search. We first established a history-driven signal: Neural decoding closely tracked the target location from the preceding trial. We further demonstrated simultaneous, distinct neural representations of the current and preceding target locations. Strikingly, even when participants attended an upcoming target location before search could commence, prior target locations were reactivated. Our results show that past experiences are reactivated in an inflexible fashion, and do so even when prior targets are completely task-irrelevant. Together, we demonstrate that goal- and history-driven selection are neurally distinct, and reveal that both influences are represented in parallel.
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3003779

PLoS One

PAPERS

ALICE PLEBE – Propensity to trust in Large Language Models

Trust is central to collaborative settings in which large language models (LLMs) are increasingly deployed. Yet little is known about whether LLMs exhibit a propensity to trust (PTT): a baseline tendency to extend or withhold trust that remains relatively stable across contexts. We investigate PTT in nineteen LLMs using two complementary approaches: a psychological self-report scale adapted from human research and a linguistic simulation framework designed to elicit trust-related decisions in context. While the questionnaire produces uniformly high PTT across models—likely reflecting social-alignment objectives and sycophantic response patterns—the simulation framework uncovers substantial, systematic differences in how models entrust others. Our simulations show that trust behavior is governed by the interaction between a baseline tendency to delegate and a model's capacity to integrate cues about trustworthiness. More capable models, such as GPT-4o-mini, use such cues to adjust their decisions, allowing competence signals to modulate baseline tendencies. By contrast, other models, such as Llama-2-7B, exhibit stable delegation patterns that are largely insensitive to task-specific evidence, leading to systematic over-entrustment. These results show that performance depends not on baseline tendencies alone, but on how they are modulated by alignment-sensitive information. Ablation studies show that task-specific memory mechanisms enable models to better integrate trustworthiness cues, improving the calibration of delegation decisions. More generally, our findings show that questionnaire-based measures cannot disentangle baseline tendencies from context-sensitive adjustment, whereas behavioral simulations make this distinction observable.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0347328

PNAS

PAPERS

FRANCES FORREST et al – Early evidence for a stable and flexible foraging niche in the evolution of Homo

Major evolutionary transitions in Homo (e.g., increased brain size, complex social behavior) are linked to reliance on high-quality foods. Increased meat consumption likely contributed to this shift, but whether hominins practiced carcass acquisition and processing strategies consistently across time and environments remains unclear. The Koobi Fora Formation spans much of the Plio-Pleistocene and is central to reconstructing the ecology of early Homo. However, zooarchaeological research has focused almost entirely on the Okote Member (~1.56 to 1.38 Ma), while the KBS Member (~1.87 to 1.56 Ma) has yielded important hominin fossils but relatively few faunal assemblages comparably well preserved for similar analysis. We present an analysis of FwJj 80 (~1.6 Ma), an assemblage from the KBS Member that preserves butchered fauna associated with early Homo fossils. Results show that behaviors documented in the Okote Member, including early access to carcasses, selective transport of limbs, and systematic marrow extraction within riparian settings, were also practiced at FwJj 80. This provides the most comprehensive and systematically analyzed evidence of such behaviors within the KBS Member, demonstrating continuity in carcass-exploitation patterns between the KBS and Okote Members. Comparisons with FLK Zinj

(~1.84 Ma, Tanzania) and Kanjera South (~2.0 Ma, Kenya) demonstrate a consistent foraging niche sustained across varied environmental contexts, underscoring behavioral flexibility as central to early Homo's evolutionary success.
https://www.pnas.org/doi/abs/10.1073/pnas.2537631123

Proceedings of the Royal Society B

PAPERS

TADEG QUILLIEN & MAX TAYLOR-DAVIES – Factive mindreading reflects the optimal use of limited cognitive resources

The capacity to represent the mental states of other individuals, known as 'mindreading' or 'theory of mind', is key to successful social prediction. We suggest that cognitive systems for mindreading are resource-rational: they are optimized for generating good predictions about the behaviour of other individuals, while not exceeding the computational capacity of the mindreader. We explore this hypothesis in a simple formal model where we derive cognitive strategies that excel at social prediction while minimizing cognitive effort. We find that it is often optimal for resource-limited mindreaders to keep track of the facts that another agent also knows, instead of explicitly representing the content of the agent's beliefs. When evaluated in mindreading tasks, simulated agents that use this 'factive' strategy tend to make mistakes in the same cases as non-human primates and young human children. Even agents that use more sophisticated strategies avoid representing beliefs unless necessary. Our results elucidate the computational principles underlying efficient social prediction and explain many of the successes and failures of human and non-human mindreading from first principles.
https://royalsocietypublishing.org/rspb/article/293/2070/20251852/481570/Factive-mindreading-reflects-the-optimal-use-of

Quarterly Review of Biology

PAPERS

JUSTON JACO et al – Red Meat in Human Evolution, Health, and Disease: From A Blessing to A Curse?

Paleoanthropological data, such as butchery tools in the archeological record and cut marks on animal fossils, indicate that access to animal tissues likely predated the emergence of the genus Homo, and that its consumption likely increased during expansion of the human lineage. "Red meat" most commonly refers to muscle tissue from large domestic mammals. The red color reflects its rich content of heme iron associated with myoglobin. Given the high nutritive value of animal-sourced foods—rich in iron, zinc, and B vitamins, and fatty tissues providing essential lipids and calories—these resources are especially important during pregnancy, lactation, weaning, and early childhood. Access to red meat and related foods thus likely shaped the evolution of our species. However, in modern contexts, overreliance on red meat—at the expense of dietary diversity from plant fibers—is associated with chronic diseases such as cancer, atherosclerosis, obesity, and type 2 diabetes. Given that red meat is now sought after in most societies, its increasing large-scale production contributes substantially to environmental degradation and climate change. Here, we examine information spanning approximately 3 million years, discussing how so-called "red meat"—once a valuable resource—has, in modern times, been transformed from a "blessing" to a "curse."
https://www.journals.uchicago.edu/doi/abs/10.1086/741185

Royal Society Open Science

PAPERS

MATT WILLIAMS et al – Do you really believe that? Examining the prevalence and predictors of belief in conspiracy theories when accounting for insincerity

Recent research suggests that some survey respondents who endorse conspiracy theories are responding insincerely. However, it is unclear to what extent this problem may distort important empirical findings with respect to conspiracy theories. In this registered report, we recruited a demographically representative quota sample of the New Zealand population (n = 810), and probed sincerity by two methods: presenting a farcically bizarre conspiracy theory and explicitly asking respondents if they had been insincere in any of their responses. We found that respondents classified as insincere according to either of these methods displayed substantially higher levels of conspiracy theory endorsement. Respondents who displayed signs of insincerity were also much more likely to endorse contradictory conspiracy theories. Furthermore, we found that the relationships between endorsement of conspiracy theories and well-established predictors (paranoia, belief in a dangerous world, cognitive reflection, and trust, but not anxiety) had significant interactions with insincerity. While some uncertainty remains about the validity of the methods that we used to detect insincerity, our findings suggest that insincere responses may distort empirical findings relating to belief in conspiracy theories. Researchers should not assume that every survey respondent who endorses a conspiracy theory believes that theory.
https://royalsocietypublishing.org/rsos/article/13/5/260163/481608/Do-you-really-believe-that-Examining-the

Science

PAPERS

EDUARDO MARISTANY DE LAS CASAS et al – Tuft dendrites in frontal motor cortex enable flexible learning

The ability to flexibly adapt behavior in changing environments is a hallmark of intelligence, yet the neural mechanisms underlying this capability remain poorly understood. In the mammalian brain, pyramidal neurons (the primary excitatory cells of the cerebral cortex) possess elaborate dendritic trees that extend far from the cell body. These dendrites have two main compartments, corresponding to the main dendritic arborizations (the basal and apical tuft dendrites). The basal compartment is thought to receive feature-specific information (e.g., sensory features in sensory cortex), whereas the apical tuft compartment receives contextual information (e.g., information from an internal source). Although neurons are often modeled as simple integrators that sum their inputs, emerging evidence, including this study, suggests that dendrites can perform complex computations through active electrical properties, potentially enabling sophisticated learning capabilities. We hypothesized that dendritic computations in frontal motor areas contribute to flexible behavioral adaptation. Apical dendrites of layer 5 pyramidal neurons in the anterolateral motor cortex (ALM) in mice receive convergent inputs from sensory and motor-planning regions. These dendrites can generate calcium-dependent electrical events that may serve as a substrate for learning. To test this hypothesis, we developed a behavioral paradigm where mice must flexibly switch between different stimulus-response rules, allowing us to dissociate task execution from the cognitive demands of relearning. We focused on a specific population of inhibitory neurons [NDNF (neuron-derived neurotrophic factor) interneurons] that selectively target the apical dendrites, providing the means to manipulate dendritic activity.

Using a combination of behavioral testing, optical recordings, and targeted neural manipulations, we discovered that calcium activity in the apical tuft dendrite is selectively required for relearning complex, but not simple, behavioral rules. When mice performed our rule-switching task, activating dendrite-inhibiting NDNF interneurons impaired their ability to relearn the complex rule after exposure to the simpler one, while leaving performance of already-learned behaviors unchanged. Two-photon (2P) calcium imaging and electrophysiological recordings revealed that this manipulation abolished global calcium events throughout the dendritic tree while preserving local synaptic activity and only moderately affecting somatic action potentials. Imaging of synaptic inputs to dendrites revealed that they organize into functional clusters during complex rule performance—a spatial arrangement that dissolved during simple rule execution. Notably, the NDNF interneurons themselves reduced their activity specifically when mice made errors during rule switching (and initial learning), suggesting that they gate dendritic plasticity.

Our findings reveal that calcium signaling in dendritic tufts serves as a critical computational resource for flexible learning. This work establishes that cortical circuits can selectively engage active dendritic computation on the basis of cognitive demands, with inhibitory control providing dynamic gating of these processes during learning. These mechanisms may explain how the brain maintains stable behaviors while retaining the capacity for rapid adaptation, with implications for understanding cognitive flexibility disorders and developing therapeutic interventions. More broadly, our results suggest that the elaborate dendritic trees of pyramidal neurons are not merely passive conduits but active computational units essential for flexible behavior.

https://www.science.org/doi/10.1126/science.adx4358

Trends in Cognitive Sciences

PAPERS

MAXIMILIAN MAIER, VANESSA CHEUNG & FALK LIEDER – Moral decision-making with bounded cognitive resources and limited information

Real-world moral decisions are constrained by limited information and bounded cognitive resources, necessitating heuristic strategies. We argue that choices in moral dilemmas should be analysed in terms of decision strategies rather than ethical theories and show how resource rationality and the bias–variance trade-off explain when people rely on particular strategies.

https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00359-6

AIDAN J. HORNER – A neural state space for episodic memories

Episodic memories are highly dynamic and change in nonlinear ways over time. This dynamism is not captured by existing systems consolidation theories that predict a unidirectional process where memories are first supported by the hippocampus and then the neocortex. Here, I propose a 3D state space for episodic memories. The first two dimensions relate to whether episodic retrieval is driven by the hippocampus and the neocortex, critically allowing for independent and additive contributions from both regions. The third dimension relates to the episodic specificity of retrieval. Memories can be located at any point in this state space and move to any other location. The state space captures the dynamic nature of episodic memory and broadens the search space of possible memory states and transformations across time.

https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00284-0

MAËLLE LEREBOURG et al – Attention in the wild: balancing flexibility and stability

To prioritize the visual processing of task-relevant objects in our surroundings, we rely on an attentional template—an internal representation of object features that guides attention toward potential targets. Decades of research have

characterized attentional templates for simple targets in artificial arrays. How could templates function in real-world search, where target appearance is variable and objects are embedded in complex, dynamic scenes? We consider two possibilities: (i) flexible templates that are adapted to changing scene contexts and (ii) stable ('one-size-fits-all') templates that generalize across contexts. We review recent behavioral and neuroimaging evidence for both possibilities and discuss how optimal search depends on balancing the relative costs and benefits of template adaptation, enabling efficient attention 'in the wild'.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(26)00078-1

EDGAR DUBOURG et al – Openness to Experience: from ecology to culture
Individuals high in Openness to Experience are more likely to enjoy imaginary worlds, visit museums, be vaccinated, support redistribution, endorse animal rights, and volunteer, alongside a wide array of other characteristic behaviors. Although these behaviors appear disparate, we propose that they form a coherent constellation grounded in a tendency to explore the unknown and tolerate uncertainty. This clarifies why levels of Openness vary across individuals, groups, and historical periods: exploration is modulated by ecological conditions such as safety and resource availability. When environments make exploration worthwhile, Openness expands; when conditions are harsh or precarious, it contracts. Consequently, ecological differences should generate systematic differences in cultural forms. This framework explains how ecological conditions shape culture through their effects on personality.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(26)00071-9

Trends in Ecology and Evolution

PAPERS

ANTOINE PERRIER, OLIVIA J. KEENAN & LAURA F. GALLOWAY – Revisiting evolution at the rear edge
Rear-edge populations occur at species' warmer range limits, with many still occupying glacial refugia. They offer insights into evolution under changing climates, yet they are underused as models. We identify three equally likely evolutionary patterns in rear edges: high genetic diversity and differentiation, elevated genetic drift, and strong local adaptation. Multiple patterns create challenges for predicting the vulnerability, conservation value, and adaptive potential of rear edges under future climates. Which factors drive these distinct outcomes, and why only some rear edges persist in former refugia, remains unclear. We propose to address these gaps by leveraging stable, receding, and trailing rear edges as evolutionary models of persistence and decline to improve predictions of species' responses to changing climates.
https://www.cell.com/trends/ecology-evolution/abstract/S0169-5347(26)00002-9

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