EAORC BULLETIN 1,221 – 8 November 2026

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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.

NEWS

BBC – How reading changes the way your brain works

Video.
https://www.youtube.com/watch?v=X1L1Hd3xfrU

NATURE BRIEFING – Ancient DNA hints at spread of languages

Two new studies analysing more than 4,700 ancient human genomes have identified the possible origins of Celtic and Germanic languages and found migrations that might have dispersed their speakers around Europe. The findings could explain why Germanic languages such as English and Dutch are so widespread, whereas Celtic languages such as Welsh and Gaelic are concentrated to a few million people in northern Europe.
https://www.nature.com/articles/d41586-026-03581-3

NATURE BRIEFING – Cave art hid in plain sight for 26,000 years

Archaeologists have described hundreds of rock-art engravings dating back more than 25,000 years in a cave frequently visited by tourists in Catalonia — a region of northeastern Spain that was thought to be almost devoid of palaeolithic art. The cave system has been open to the public for decades and became a museum in the 1990s, but these motifs were missed because they "are really difficult to see", says archaeologist and study co-author Míriam Salas-Altès. "You have to play with light from different directions to see the depressions."
https://www.nature.com/articles/d41586-026-03585-z

NATURE BRIEFING – Podcast: Where this language came from

Linguists and historians have long debated the origin stories of the Celtic and Germanic languages. To help shed light on where they might have come from, a team has looked at ancient DNA to trace the migration patterns of people who might have carried these languages with them as they moved across Europe.
https://www.nature.com/articles/d41586-026-03582-2

NATURE BRIEFING – The truth is that we all live in the grey zone

"The truth is that we all live in the grey zone, a psychologically awkward reality in which villainy, victimhood, and heroism can mingle in a single person."
Psychologists Paul Bloom and Azim Shariff explore the human tendency to 'morally typecast' the perpetrators and victims of misbehaviour, and why that seems to be on the rise.
https://www.newyorker.com/culture/open-questions/whos-the-real-victim

NEWS FROM SCIENCE – The Moon may have squeezed Earth's first continents into existence

As our young planet spun down, its bulging shape gave way to a sphere, driving the formation of continental crust.
https://www.science.org/content/article/moon-may-have-squeezed-earth-s-first-continents-existence

NEWS FROM SCIENCE – Mighty and mysterious Celts hailed from the heart of Europe

Ancient DNA sheds light on history of modern languages such as Welsh and Gaelic.
https://www.science.org/content/article/mighty-and-mysterious-celts-hailed-heart-europe

SCIENCEADVISER – Unsquashing Earth

Earth has not always been the sphere that we know and love today. Some 4.5 billion years ago, just after a mysterious planetary object smashed into Earth to form the Moon, the planet spun at a furious pace, with days lasting as little as a few hours long. The resulting centrifugal force squashed the planet's shape, making it look like a soccer ball after one too many kicks.
This shape, a new study argues, would have resulted in a band of thick crust around the equator. Then, as the Moon moved away and the planet's spin slowed, Earth would have relaxed toward its spherical shape, causing immense strain on the nascent crust. The resulting strain could have driven the melting and volcanism that set the stage for the first continental crust to emerge.
It's a deceptively simple idea, but one that models of the planet's early evolution have so far overlooked. It could explain why signs of continental crust have appeared so early in Earth's history, and also oddities deep in the mantle, like two mysterious and massive regions of dense rock that still sit on the boundary between the mantle and core. Indeed, the interplay with the Moon could even explain the origins of plate tectonics—and why Earth developed into a habitable world.
https://www.science.org/content/article/moon-may-have-squeezed-earth-s-first-continents-existence

SCIENCEADVISER – Birds' songs sound like ours

In the wake of daylight savings, you might be hearing birds chirping a bit earlier in the morning than your alarm clock. Many bird vocalizations can sound singsongy to our ears—and new research shows just how much these trills resemble our own music.
Researchers analyzed the frequency, timing, duration, and loudness of songs from 367 bird species by annotating more than 70,000 individual syllables in recordings. They then compared the sounds with datasets of speech and songs across 52 human languages.
The team found many similarities between birdsongs, and human speech and music, such as small pitch changes, elongated sounds at the end of phrases, and regular rhythms. Since some birdsongs displayed more qualities of human speech, while others better mirrored human music, biopsychologist Kazuo Okanoya explained in a related Perspective that " these findings show that birdsong cannot simply be placed on a continuum from speech to music."
The results indicate that the biological bases of vocalizing, rather than just its social context, may shape the similarities across species. For example, both birds and humans need to coordinate breathing with the muscles involved in producing sound. "If this is true, it's possible these patterns may be found in many other species," wrote the authors in The Conversation.
https://www.science.org/doi/10.1126/science.aem2333

SCIENCEADVISER – 1000 days of childlike learning

None of us can remember how we first learned to speak. Just after we're born, we're surrounded by language—our parents talking, videos and music playing, and so on. Until recently, modeling learning from this incredibly noisy experience has been computationally impossible. Now, however, we have deep learning AIs.
Researchers took full advantage of these new sophisticated models by training them on the real sounds of children's first 1000 days. Eight separate models learned from a single child's soundscape—"each model learned only from the speech available to that child, processed day by day in the order it was originally experienced," the team explained in their paper.
The team also created a "developmentally realistic schedule" for the AI, where the model's daily exposure duration increased gradually over time, mimicking the way young children spend more time awake as they get older. There was also a form of replay at night—an AI's dreams, if you will.

Within the first year, the models learned to distinguish talking from other sounds—much like kids do. And over the following years, they learned thousands of words, as did the children whose worlds these AIs actually listened to. So in many ways, the AIs appeared to learn like kids.
But does this really demonstrate childlike learning? That's "a more fundamental question," wrote Zara Harmon and Caroline Rowland in a related Perspective. "Functionally similar behavior can arise from different representations and learning processes," they noted. "Determining which aspects of the model correspond to mechanisms driving word learning in a child and which are computational solutions that allow the model to capture child-specific learning trajectories is a key question for understanding how children learn."
https://www.science.org/doi/10.1126/science.aem3978

SCIENCEADVISER – Celtic at heart

Today, Celtic languages are spoken as a mother tongue only on the far fringes of Europe. But a new analysis, based on ancient DNA as well as linguistic clues and archaeology, shows the prehistoric homeland of the Celts lay in Europe's very heart. "The ancient DNA has, to a large extent, corroborated what we had been arguing about prehistoric population movements based on purely linguistic grounds," said a historical linguist not involved with the research. "But it's really interesting to see the fine-grained distinctions they are now able to make."
https://www.science.org/content/article/mighty-and-mysterious-celts-hailed-heart-europe

THE CONVERSATION – When a bull falls for a donkey: what this reveals about animal sexuality

Same-sex behaviour is common in animals, but a bull and a male donkey in Ethiopia are an unusual pair. What might they tell us about sex in nature?
https://theconversation.com/when-a-bull-falls-for-a-donkey-what-an-unlikely-relationship-reveals-about-animal-sexuality-295306

THE CONVERSATION – DNA tracked the origins and spread of the Germanic and Celtic languages

The findings are based on analysis of DNA from thousands of prehistoric human remains from Europe.
https://theconversation.com/we-used-ancient-dna-to-track-the-origins-and-spread-of-the-germanic-and-celtic-languages-new-research-295786

THE CONVERSATION – Stone-age hunters in northern Europe may have used poison arrows for big prey

The small size of some stone-age arrow heads from Denmark suggest they were used together with poisons.
https://theconversation.com/stone-age-hunters-in-northern-europe-may-have-used-poison-arrows-to-hunt-big-prey-294856

PUBLICATIONS

Academia Neuroscience and Brain Research

PAPERS

ROB DIELENBERG – Autopraxis: a biological model of limited free will

Darwinian continuity and physical monism are traditionally thought to preclude free will, a conclusion reinforced by framing freedom as an instantaneous capacity to choose otherwise (the "branching problem"). This paper proposes an alternative: limited free will is the cumulative capacity of a physical system to modify the dispositions—the "bias function"—from which its future behavior emerges. I term this recursive self-editing autopraxis and contrast it with allopraxis (modification driven primarily by external contingencies). Neurobiologically, autopraxis is hypothesized to be supported by the decoupled default mode network (DMN), which permits internally generated cognition to contribute to restructuring the self-model. Because a recursively self-editing system continually changes its effective, level-specific dynamical organization, its future cannot be exhaustively characterized by a fixed state-plus-effective-law description at that level. I term this condition "incomplete determinacy." This claim does not require a violation of fundamental physical determinism: the underlying physical laws may remain fixed while the system continually modifies the higher-level dispositions through which those laws are behaviorally organized. While non-human animals exhibit "biological freedom" through allopraxis, metacognitive monitoring, and unconscious autopraxis, the present framework proposes that they lack the declarative, self-aware grade of self-editing required for limited free will. Supported by the evolutionary specialization of the human DMN, this declarative autopraxis is proposed as a structural discontinuity between humans and other primates. Ultimately, human agency is not an exemption from physical causation, but a biologically instantiated capacity to participate in the construction of one's own future dispositions.
https://www.academia.edu/3071-4087/2/3/10.20935/AcadNeurosci8547

Antiquity

PAPERS

JOSEP MARIA VERGÈS BOSCH & MÍRIAM SALAS-ALTÈS – Filling gaps: the Palaeolithic rock art of the Cova de la Font Major on the north-east Iberian Peninsula

Until recently, Palaeolithic parietal art was scarce in the north-eastern Iberian Peninsula. An assemblage of engravings found within Cova de la Font Major in 2019, and described here, now calls this apparent artistic lacuna into question. Comprising 280 motifs, encompassing 55 zoomorphic figures and a range of non-figurative representations, the Font Major assemblage is positioned as one of the largest Palaeolithic cave art ensembles in the Iberian Mediterranean. Its recent discovery calls for a reconsideration of regional preconceptions, while the attribution of numerous representations to pre-Magdalenian phases establishes the site as a key reference for studying Palaeolithic symbolic expressions.
https://www.cambridge.org/core/journals/antiquity/article/filling-gaps-the-palaeolithic-rock-art-of-the-cova-de-la-font-major-on-the-northeast-iberian-peninsula/B61327338FF78E966BEA56E2DA9CAEDB

Cell Reports

PAPERS

MATTHEW B. BROSCHARD et al – Theta-based organization of information in the frontal cortex

Theta (4–10 Hz) oscillations seem to coordinate activity across long-range distances. It is less clear how theta coordinates activity more locally within frontal subareas. We examined activity in the dorsolateral prefrontal cortex (dlPFC), ventrolateral prefrontal cortex (vlPFC), and frontal eye fields (FEFs) as non-human primates categorized dot patterns. We characterized how theta coordinates activity within frontal cortex. First, theta phase selectively couples to behaviorally relevant information in spiking. Second, theta influences move in a posterior direction during choices (i.e., dlPFC/vlPFC to FEF) and after correct outcomes (i.e., dlPFC to FEF), but not after errors. Instead, anterior-direction (i.e., FEF to vlPFC) theta influences are stronger after errors. Third, theta participates in behaviorally associated nested cross-frequency interactions. Theta couples to beta (15–30 Hz) oscillations during choices and after errors, whereas beta couples to gamma (40–90 Hz) oscillations after correct outcomes. Our results position theta as a critical mechanism that flexibly and dynamically coordinates activity in frontal cortex.
https://www.cell.com/cell-reports/fulltext/S2211-1247(26)01341-0

Current Biology

PAPERS

ANDRÉ B. DA CRUZ et al – A socio-sexual bond between a bull and a male donkey

Same-sex sexual behaviour is widespread in animals, yet to our knowledge observations of such behaviour between individuals of different taxonomic families remain rare. In a grazing area on an Ethiopian plateau (Debre Libanos, Oromia), Achille, a bull (Bos taurus/indicus), and Patroclo, a male donkey (Equus asinus), actively engaged in reciprocal socio-sexual interactions, thus forming an unusual association. Although interpreting this behaviour is challenging, the mounting attempts, taken together with the repeated and mutual affiliative interactions between the two animals, may signal the quality of their relationship. The interactions must have reproductive opportunity costs, in time and energy diverted away from potentially functional reproductive activities, and it would seem that these costs are outweighed by the strength of the animals' social bond.
https://www.cell.com/current-biology/fulltext/S0960-9822(26)01230-3

eLife

PAPERS

LENNART LUETTGAU et al – A neural mechanism for compositional structure transfer in humans

A human ability to adapt to the dynamics of novel environments relies on abstracting and generalizing from past experiences. Previous research has focused on how humans generalize from isolated sequential processes, yet we know little about mechanisms that enable adaptation to more complex dynamics, including those that govern much everyday experience. Here, using a novel sequence learning task based on graph factorization, coupled with simultaneous magnetoencephalography (MEG) recordings, we ask whether reuse of experiential "building blocks" enable inference and generalization. Behavioral results were consistent with participants decomposing task experience into subprocesses, abstracting their dynamical structure away from their sensory specifics and transferring these to a new task environment. Neurally, this transfer was associated with a learning-induced, condition-specific, increase in neural similarity among stimuli conditional on their structural role in abstract subprocesses that were shared across task phases. Consistent with this, a complementary dynamical role decoding analysis revealed enhanced neural decodability for stimuli sharing identical structural transition types across experiential contexts, specifically when prior experience included the relevant graph structure. Decoding strength for these role representations was positively related to behavioral success in subprocess knowledge transfer, a relationship that will require future independent replication. These findings provide neural evidence consistent with the idea that a structural scaffolding mechanism supports generalization of experience to new contexts.

https://elifesciences.org/reviewed-preprints/107162

Frontiers in Neuroscience

PAPERS

HANGJUN CHU & TAO GONG – From beat to syntax: evolutionary and developmental paths of a shared neural resource for hierarchical processing in music and language

Children who track a musical beat well tend to have stronger grammatical skills, and brief exposure to a regular rhythm can transiently improve grammatical processing. These findings raise the possibility of a shared underlying mechanism, and with it two questions: where did the link come from, and when does it emerge in development? Our central hypothesis is that beat perception, the extraction and prediction of a metrical pulse, and hierarchical syntactic structure building draw on a common computational principle, predictive neural entrainment: the alignment of cortical activity to rhythmic input in a way that enables temporal anticipation. Comparative work indicates that non-human primates track regular input but show little evidence of beat-based prediction. We propose that during hominin evolution the expanding prefrontal cortex exerted stronger top-down control over the auditory-motor pathway, extending an ancestral timing system to meet the hierarchical demands of syntax. For development, we distinguish capacities present in infancy, including beat sensitivity and temporal prediction, from the later coupling of beat-based prediction to syntax, which we hypothesize depends on fronto-temporal maturation; when that coupling emerges is an empirical question. We integrate neuroimaging, comparative, developmental, and clinical evidence into a three-layer model: temporal encoding, structural grouping, and hierarchical prediction, each tied to a distinct neural signature. The model offers an account of why regular rhythmic primes facilitate grammatical processing and why that effect is fragile, why musical experience transfers to speech, and why early insult can leave regularity extraction intact while productive language lags. We separate empirical findings from inferences and state five falsifiable predictions, spanning cross-species comparison, longitudinal development, clinical populations, intervention, and selective musical deficits.

https://www.frontiersin.org/journals/neuroscience/articles/10.3389/fnins.2026.1967182/full

Frontiers in Psychology

PAPERS

OLIVER T. BELLMANN, MELINA WITT & MARISA HOESCHELE – Musical capacity was present in Homo sapiens 135 thousand years ago: genomic lower bounds and the emergence of human musicality

Music is central to what makes us human. Yet, despite decades of research across cognitive science, archaeology, and evolutionary biology, there is no consensus on when human musicality first emerged. Musicality is the set of abilities required to perceive, produce, and appreciate music (Honing et al., 2015). Estimates for its emergence range drastically, depending on what one looks for: bone flutes appear in the archaeological record around 40 thousand years ago (kya; Conard et al., 2009). Meanwhile, theoretical models, e.g., of “musilanguage,” a hypothesized ancestral communication system preceding language and music, suggest the roots of musical behavior date much further back (Brown, 2017; see also Mithen, 2006; Bannan, 2008; Fitch, 2010, 2013).

https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2026.1992265/full

ANTONIO CHELLA – Language as a revisable control representation in human and artificial systems

Language can encode conditional rules that are maintained and revised during action. This Perspective proposes relational self-cuing: familiar linguistic constructions help retrieve control rules and bind their variables to current goals, evidence, and actions. The hypothesis predicts a natural-language advantage over informationally matched encodings on novel rule combinations, with a larger advantage there than on practiced mappings. Human task-switching findings motivate this hypothesis, while evidence separating language from domain-general cognition constrains its scope. Global workspace accounts supply a question about selective availability for control, rather than a warrant for attributing consciousness to language agents. The Affective-Cognitive Operating System is reformulated as an unvalidated reference specification for testing the hypothesis. Its proposed implementation distinguishes model-generated records, externally enforced action constraints, and independent execution evidence. A proposed routing experiment would separate causal record use, representational format, and appraisal-dependent policies. A corresponding prospective human experiment would test conditional linguistic self-cuing against general working-memory load. Selective intervention effects and advantages over matched controls would support bounded claims about control; sufficiently precise equivalence would favor simpler explanations. Neither outcome alone establishes phenomenal consciousness.

https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2026.1929606/full

RICCARDO MANZOTTI & PIETRO PERCONTI – Quining qualia again. Ten reasons

Qualia have long occupied a central place in the science and philosophy of consciousness, often invoked as the subjective residue that eludes physical explanation. In this paper, we argue that the classical concept faces serious explanatory and ontological difficulties. We present 10 reasons for setting it aside: (1) its unstable causal status; (2) the regress of the inner observer; (3) the absence of a determinate neuroscientific target; (4) the lack of autonomous empirical evidence for a quale

as such; (5) its epistemic redundancy and duplication of properties already attributed to the world; (6) the reflexive architecture that makes experience available in a first-person format; (7) the limits and reconstructive character of introspection; (8) linguistic reification; (9) the apparent immediacy of experience; and (10) the persistence of residual dualist pictures. We do not deny that experiences occur, differ qualitatively, and are undergone from a first-person point of view. We reject the stronger interpretation of those differences as intrinsic, ineffable, immediately self-revealing, and metaphysically private properties located in an inner mental domain.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2026.1758241/full

iScience

PAPERS

PAUL VAN EECKE & KATRIEN BEULS – PyFCG: A Python toolkit for constructionist language processing and learning
This article introduces PyFCG, an open-source scientific software toolkit that enables its users to efficiently integrate state-of-the-art constructionist language processing and learning into larger Python projects. The toolkit provides a fully Pythonic interface to the leading computational construction grammar framework, Fluid Construction Grammar (FCG), facilitating its swift integration with Python's rich ecosystem of libraries, in particular those implementing today's most popular machine learning techniques. Apart from a general description of the toolkit, this article provides three illustrative case studies that demonstrate how PyFCG facilitates (i) the formalization and computational operationalization of construction grammar analyses, (ii) the learning of usage-based construction grammars from corpora of language use, and (iii) the implementation of multi-agent emergent communication experiments that combine symbolic and neural computation.
https://www.cell.com/iscience/fulltext/S2589-0042(26)03512-1

Mind & Language

PAPERS

PETER CARRUTHERS – The motoric theory of curiosity
What is the nature of curiosity? There are two types of accounts currently in the literature. According to one, curiosity is a metacognitive desire. According to the other, curiosity is a desire-like attitude that embeds a question as its content. The present paper proposes a third alternative, according to which curiosity directly motivates innate or learned investigative behavior. It makes such behavior seem attractive and renders subsequent learning rewarding. No questions are needed; nor is any contentious form of self-awareness required. The paper begins by critiquing the two existing theories, building on those criticisms to develop the motoric theory thereafter.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.70017

REVIEWS

SALVADOR MASCARENHAS – The puzzle of language without syntax: A review of Steven Mithen's The Language Puzzle
In The language puzzle, Steven Mithen assumes that universal grammar has been altogether debunked, and argues that the question of the origin of natural-language syntax and compositionality has largely been answered by the work of computational evolutionary linguists Simon Kirby and collaborators, thus: "syntax spontaneously emerges from the generation-to-generation language-learning process itself". I show that Kirby and collaborators' work in fact presupposes the entirety of syntax in an innate language of thought, and that it subscribes to a notion of universal grammar no weaker than the mainstream one from generative linguistics in the 21st century.
Review of 'The Language Puzzle: How we talked our way out of the Stone Age' by Steven Mithen, Profile Books (2024).
https://profilebooks.com/work/the-language-puzzle/

COMMENTARIES

STEVEN MITHEN – Language without syntax? What a crazy idea! A reply to Salvador Mascarenhas
Salvador Mascarenhas's review of my 2024 book The language puzzle focusses on one specific issue: the existence or otherwise of universal grammar. While this has been a valuable notion within the history of linguistics, it is an idea that lacks evolutionary credibility and needs to be discarded. When defending universal grammar, Mascarenhas inadvertently misrepresents how I draw on that idea and my reasons for rejecting its validity. If Mascarenhas and other linguists wish to maintain the idea of universal grammar and persuade others of its veracity, they need to explain when, how, and why it could have evolved.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.70066

Nature

NEWS

The palaeo cave art that hid in plain sight for 26,000 years
Hundreds of engravings were spotted in a widely visited cave — some include signs of animation.
https://www.nature.com/articles/d41586-026-03585-z

Rise of Germanic and Celtic languages is written in ancient DNA
Thousands of genome sequences identify human migrations that might have spread early forms of these tongues around Europe.
https://www.nature.com/articles/d41586-026-03581-3

PAPERS

HUGH MCCOLL et al with ESKE WILLERSLEV – Tracing the spread of Celtic languages using ancient genomics
Celtic languages are today restricted to Europe's Atlantic fringes but were widely spoken across the continent during the Iron Age. How Celtic achieved this early distribution remains contested, with alternative archaeological and linguistic models proposing different homelands and dispersal routes. Here we analyse genome-wide data from 4,587 ancient individuals, focusing on Bronze and Iron Age Europe, to test the extent to which these models fit reconstructed demographic histories. We identify three main processes shaping European population structure that are relevant to the Celtic dispersal. First, the arrival of Steppe-related ancestry with Bell Beaker-associated groups after around 4400 bp (calibrated years before present or 1950 ce) across the region in which Celtic and related languages were later spoken. Second, a movement from southwestern Europe into Britain during the Bronze Age (3800–3200 bp), consistent with scenarios in which Celtic formed along the Atlantic façade. Third, a westward expansion of ancestry related to Late Bronze Age Knovíz–Urnfield-associated populations from eastern central Europe (3200–2800 bp), affecting France, the British Isles, northeastern Iberia and Italy and later associated with Iron Age Hallstatt and La Tène contexts. Although all three movements have parallels with proposed models, we argue that the final movement, from eastern central Europe, is most parsimonious for the spread of Celtic. Although human history does not necessarily follow a parsimonious trajectory and language shifts need not track genetic change, these results delimit the demographic scenarios that are plausible for the emergence of Celtic in prehistoric Europe.
https://www.nature.com/articles/s41586-026-11198-9

Nature Scientific Reports

PAPERS

SOPHIE T. KOERNER, BORIS EGLOFF & SARAH OSTERHOLZ – Personality expression and perception in large language models and humans
Growing numbers of people frequently turn to Large Language Models (LLMs) for concerns from various areas of life. Because its content has become ubiquitous, examining user perceptions of LLM-produced text and its distinguishability from human writing is crucial. This study investigated how seven LLMs (ChatGPT-4o, ChatGPT-3.5, Llama 3, Gemma, Gemini, Phi-3, Orca-2) describe themselves when compared to humans. LLM-generated outputs and human responses were collected using psychological questionnaires (Big Five, self-esteem, narcissism) and tailored prompts to elicit short self-descriptive texts. Six LLM and ten human judges then evaluated personality traits and text origin based on these self-descriptions (140 total, half LLM-generated). Results show that current LLM outputs can convey personality-consistent cues in questionnaires and texts. The perception of such significantly differed from that of humans. Both LLM and human judges accurately inferred personality from short self-descriptions and correctly differentiated between LLM-generated and human text. Linguistic analysis and participant feedback revealed textual cues distinguishing LLM-produced from human language and offered insights into how LLM versus human judgment and decisionmaking differ.
https://www.nature.com/articles/s41598-026-75546-5

New Scientist

ARTICLES

KATE DOUGLAS – We are finally pinning down what makes dyslexic brains different
Humans never evolved to read and write, and around 10 per cent of us are dyslexic. Now, we are uncovering the pathways underlying the condition, opening up new ways to support people who struggle to read.
https://www.newscientist.com/article/2594803-we-are-finally-pinning-down-what-makes-dyslexic-brains-different/

DANIEL LIEBERMAN (interviewed by SOPHIE BERDUGO): Humans evolved to be surprisingly fat – no wonder we struggle with dieting
We have an unprecedented choice of food, yet our diets are worse than ever, says palaeoanthropologist Daniel Lieberman. So what can evolution tell us about how to eat better?
https://www.newscientist.com/article/2595250-humans-evolved-to-be-surprisingly-fat-no-wonder-we-struggle-with-diet/

JO MARCHANT – Curiosity may be what drives our brains to become so complex
We often think that our ability to be curious stems from our complex, human brain – but what if curiosity shapes that complexity?
https://www.newscientist.com/article/2596932-curiosity-may-be-what-drives-our-brains-to-become-so-complex/

CHRIS STOKEL-WALKER – AI refutes 30-year-old mathematical assumption in computer science
A central tenet in computer science has apparently been disproven by OpenAI, a result that will force textbooks to be rewritten if it is confirmed.
https://www.newscientist.com/article/2596045-ai-refutes-30-year-old-mathematical-assumption-in-computer-science/

CHRISTA LESTÉ-LASSERRE – Access to stone as well as water governed where early humans lived
The sands of the Arabian peninsula were once dotted with lakes that teemed with life, but early humans avoided them unless they came with easy access to stone for tool-making.
https://www.newscientist.com/article/2596225-access-to-stone-rather-than-water-governed-where-early-humans-lived/

NPJ Palaeoecosystems

PAPERS

GABRIELE A. MACHO et al – The Taung child and the biogeographic and palaeoclimatic drivers of southern African hominin diversity
The discovery of the Taung child, the holotype of Australopithecus africanus, marked a turning point in palaeoanthropology and stimulated the search for hominin fossils in Africa. Despite numerous Plio-Pleistocene hominin discoveries, particularly in eastern and southern Africa, Taung's evolutionary position and relationship to other hominins remains unclear. Here we explore whether an eco-evolutionary range dynamics framework can help explain early hominin diversity in southern Africa. Focusing on the Taung child -the only unequivocal A. africanus specimen- we first reassess the site's chronological age and examine the fossil's dental and brain development, and M1 dentino-enamel junction variation. These analyses confirm that A. africanus is a poorly defined taxon. Based on new palaeoclimatic and palaeoenvironmental evidence, combined with considerations about South Africa's geographic position and the Zambezian–southern African biogeographic boundary, we propose that complex population dynamics, including drift and hybridisation, probably underpin hominin morphological diversity in southern Africa during the Plio-Pleistocene.
https://www.nature.com/articles/s44513-026-00008-2

Philosophical Studies

PAPERS

CHRISTOPHER GAUKER – The genesis of inner speech: forward models or constructive imagination?
Inner speech is often said to be a by-product of motor control, the product of a forward model driven by an efference copy of a cancelled motor command to speak. The conscious auditory imagery of inner speech is said to arise when the product of this forward model becomes conscious. This conception of the genesis of inner speech founders on some basic questions about the consciousness of inner speech and about the interaction between inner speech and episodes of imagination. Further, the empirical evidence cited in support of this theory falls short. An alternative starts with a general conception of constructive imagination, which is our capacity to produce mental images (visual, auditory, etc.) in the course of practical problem-solving. Inner speech may be conceived as a species of constructive imagination in which we construct auditory images of episodes of speech. Inner speech is an imaginative representation of speech events that do not exist, which also represents the objects and events that the represented episodes of speech would represent if they existed.
https://link.springer.com/article/10.1007/s11098-026-02625-8

Philosophy Compass

PAPERS

NOAH BETZ-RICHMAN, ELISABETH CAMP & ETHAN NOWAK – Social Meaning in Language
Human speech is socially meaningful: Linguistic expressions and forms carry information about the social properties of the speaker and/or the discourse situation, independent of their at-issue, truth-conditional, compositionally determined contents. Further, speakers leverage these social meanings to perform conversational moves. In this article, we synthesize recent work that incorporates social meaning into the philosophy of language. We showcase similarities and differences among classes of socially meaningful speech and review some of the main theoretical challenges such speech raises. In particular, we contrast indexical, intentional, and neo-inferentialist approaches to social meaning; ask whether and when socially meaningful speech should be treated as representing or as altering the world; and explore what semantic classifications and pragmatic functions to assign social meaning. We conclude by proposing some promising avenues for future research.
https://compass.onlinelibrary.wiley.com/doi/10.1111/phc3.70135

PLoS Biology

PAPERS

NIKOLAOS SMIT et al – Infant presence and mother-infant conflict predict fetal loss in wild mandrills

Female fitness depends on reproductive pace and offspring survival, both of which are determined by the ability to balance resource allocation between current and future reproduction. Using 11 years of data on 356 pregnancies (52 of which resulted in fetal loss) from 117 wild female mandrills, we show that females who conceive while still caring for a young infant experience a greater probability of fetal loss as well as increased mother-infant behavioral conflict in the form of maternal rejection. In addition, females whose infants throw more tantrums show a greater probability of fetal loss, consistent with observations from other species where living offspring can interfere in parental reproduction. Finally, females who lose a fetus show greater subsequent reproductive success (produce more surviving infants and show shorter inter-birth intervals) than females who give birth but their infants die soon after birth. These findings suggest that fetal loss may represent an adaptive physiological response to the energetic constraints imposed by overlapping gestation and maternal care, potentially limiting the fitness costs associated with short inter-birth intervals and concurrent investment in multiple dependent offspring.
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3003970

Problemos

PAPERS

SOFIA SEGTOVICH FRANKLIN et al – Immediacy of Experience and Linguistic Relativity: Epistemological Architectures in the Pirahã Debate

The Pirahã debate has been predominantly framed as an empirical dispute over recursion and universal grammar. This article argues that such framing leaves important epistemological assumptions insufficiently examined. Based on a systematic qualitative review of Web of Science-indexed publications (n = 25), the study uses structured coding to examine positions on recursion, conceptions of experience, and underlying epistemological assumptions. The qualitative synthesis was operationalised in a comparative matrix (Experience × Epistemology × Recursion × Relativity). The analysis identifies three ontologies of experience – data, norm, and structure – and four explanatory architectures: cultural–pragmatic, computational–universalist, methodological–formal, and ontological–phenomenological. It also situates the debate within weak linguistic relativity, including numerical cognition research on Pirahã. Across these perspectives, 'immediacy of experience' emerges as an epistemologically variable construct rather than a deterministic constraint. The article rejects strong determinism and reframes Pirahã as a limit case revealing competing hierarchies of explanation.
https://zurnalai.vu.lt/problemos/en/article/view/46330

Review of Cognitive Linguistics

PAPERS

GERD CARLING & NOUR EFRAT-KOWALSKY – Culture or cognition? The evolutionary dynamics of gender assignment in the Indo-European lexicon

Gender languages assign nouns to a category, such as masculine, feminine, neuter or common. Gender assignment is complicated and difficult to learn, as languages do not have specific rules for assigning a noun to one or the other gender. This study looks at gender assignment from the perspective of semantics and lexical semantic evolution, exemplified on the Indo-European family. Gender assignment has a semantic core, in which animate nouns are more likely to be masculine, inanimate nouns feminine and neuter, nature nouns masculine, and culture nouns feminine or neuter. To investigate how these patterns emerge, we study the evolutionary dynamics of these semantic properties on a gender-coded lexical data set for Indo-European. We find that masculine is a stable gender that remains in its semantic category and does not change. Feminine is also a stable category which may get lost or transfer to masculine. Neuter and common are unstable categories, which continuously alter or get lost in gender assignment. In sum, our result shows that the semantic core of gender — affected both by cognitive and cultural factors — remains stable and does not vacillate in evolution.
https://www.jbe-platform.com/content/journals/10.1075/rcl.00274.car

Royal Society Open Science

PAPERS

GABRIELLA E. SMITH, MEGAN L. LAMBERT & AMANDA M. SEED – Quantifying 'surprise' in capuchin monkeys (Sapajus apella)

Violation-of-expectation (VoE) events offer a fascinating lens into the intersection of cognition and emotion. Research suggests that, like humans, many animals are susceptible to VoE events in many physical domains, susceptibility typically assessed through behaviours such as visual and physical exploration of a stimulus. In humans, such susceptibility has been further documented through emotional surprise, such as delight following positive surprise and frustration following negative surprise. However, evidence in animals remains relatively limited. To address this gap, this study examined behavioural, cognitive and emotional responses of capuchin monkeys (Sapajus apella) to bait-and-switch VoE events of food items. Capuchins were chosen for this study not only for their exploratory and information-seeking behaviours, but also for

known emotional responses to VoE events (e.g. frustration following inequity aversion). Contrary to prior research, this study found no evidence for violation susceptibility via behavioural, cognitive or emotional responses. Overall, such findings contribute valuable information to the VoE literature in primates regarding methodology and information salience, as well as underscore the current challenges of investigating emotional surprise in animals. Future research may benefit from establishing stronger expectations (e.g. more salient stimuli), to better investigate and quantify surprise to VoE events in animal species such as capuchin monkeys.
https://royalsocietypublishing.org/rsos/article/13/11/260264/484003/Quantifying-surprise-in-capuchin-monkeys-Sapajus

Science

ARTICLES

ZARA HARMON & CAROLINE F. ROWLAND – Modeling word learning, child by child
A computational approach to learning reproduced key features of child language development.
https://www.science.org/doi/10.1126/science.aem3978

PETER SOYSTER – The science of the individual
A new paradigm for behavior change is tested.
https://www.science.org/doi/10.1126/science.ael2415

PAPERS

HADAS RAVIV et al – The first 1000 days: Modeling language learning from individual children's everyday speech
Children learn to understand and produce speech from the language they hear every day, but how that everyday experience shapes learning remains an open question. Modern artificial intelligence (AI) language models show that language can be learned from data, yet they train on far more input than any child hears, using training protocols that are quite different from how children actually learn. Understanding how children learn language from everyday experience requires computational models built to learn the way children do, from the real-world input available to an individual child and on realistic developmental timescales.
To test this idea, we used ultradense home recordings from the First 1000 Days project: thousands of hours of everyday speech collected for each of eight children across their first 1000 days of life. We built a separate learning model for each child, with no prior knowledge of speech or words. Each model learned only from the speech available to that child, processed day by day in the order it was originally experienced. Training followed a developmentally realistic schedule, with daily exposure gradually increasing as children spent more time awake and recent speech revisited at the end of each day to approximate the role that sleep may play in memory consolidation. We then tested whether the models learned distinct speech sounds and words and whether their learning pace tracked the developmental trajectory of the corresponding child. Trained this way, the models learned to distinguish English speech sounds within roughly the first simulated year and went on to build vocabularies of thousands of words, with growth closely tracking each child's measured vocabulary. Two aspects of the experience were especially important. First, input density was critical: Models given only a fraction of a child's daily recordings learned far fewer words, likely because many everyday words are rare and require repeated exposure. Second, nightly replay was equally important: Models given little or no replay struggled to learn words, even when their daily input was rich. The same modeling framework worked across all eight children without modification. Within that framework, three internal model parameters governed the pace of learning, capturing individual differences and offering an interpretable account of how learning mechanisms interact with experience to support language acquisition.
Together, our results show that the everyday speech available to an individual child, combined with biologically inspired learning and memory processes, provides sufficient structure to support core aspects of language learning. More broadly, our approach offers a framework for translating theories of how children learn into computational models that can be tested directly against children's real-world development.
https://www.science.org/doi/10.1126/science.aeh9311

Science Advances

PAPERS

KATHRYN C. O'NELL, KIARA L. SANCHEZ & EMILY S. FINN – Pink noise in dyads' semantic similarity trajectories predicts conversation enjoyment
Conversation is a core component of human social life. Many influential theories treat conversation as a linear system, i.e., the sum of its parts. However, linear accounts of semantic entrainment lose explanatory power at their upper limits: Discussing perfectly aligned opinions becomes boring. We propose an alternate account that considers the multiscale organization of semantic similarity over the course of a conversation, as indexed by pink noise ***{pink noise resembles natural sounds, such as steady rainfall, rustling leaves, a flowing river, or ocean waves}***. Here, we test whether pink noise can be found in interlocutors' conavigated trajectories through semantic space. Not only is pink noise present, but its strength predicts positive conversation outcomes like enjoyment and connection, increases with practice, and is reflected in a large

language model's representation of conversation quality. These results demonstrate an important role for scale-free dynamics in characterizing successful conversation.
https://www.science.org/doi/10.1126/sciadv.aeb2684

Trends in Cognitive Sciences

ARTICLES

JUAN M. TORO – A consonant bias in dogs
Do dogs perceive speech similarly to humans? A recent work by Morvai et al. suggests that dogs develop a focus on consonants to identify words, resembling results observed in humans. This is likely the result of massive exposure to language combined with an evolutionarily ancient ability to track regularities in the signal.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(26)00257-3

PAPERS

DORSA AMIR & BENJAMIN PITT – What does it mean for culture to 'shape' cognition?
Human culture and cognition vary widely across groups, but how exactly culture 'shapes' cognition remains underspecified. In this review, we outline four qualitatively different pathways by which culture can shape cognition. In this framework, culture can (i) privilege some cognitive processes, while leaving alternative processes intact; (ii) prune unused alternative processes, which are irretrievably lost; (iii) produce new cognitive processes; or (iv) have no effect on cognition at all. To illustrate the utility of this framework, we apply it to three debated effects of culture on cognitive processes, namely, visual illusions, large exact number abilities, and spatial–numerical associations. The distinctions we propose can serve to reframe long-standing debates, sharpen empirical predictions, and open new avenues of research in cognitive diversity.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(26)00022-7

LUCA S. RINALDI & VITTORIO GALLESE – How the mouth became symbolic
Before we name, we touch. We propose that the roots of language lie not in abstract, amodal symbols but in early bodily experience. Early haptic and oral interactions ground conceptual knowledge through active exploration. The mouth, acting as a cognitive organ, functions not only as a site of articulation but also as a locus of tactile perception and intersubjective exchange. We suggest that language may have evolved through the neural reuse of circuits originally dedicated to ingestion and action understanding. These circuits were progressively shaped by affordances, embodied simulation, and sound symbolism. From sensorimotor patterns to iconic vocal forms, we trace a pathway linking bodily experience to symbolic reference, through which language acquisition could arise.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(26)00049-5

MILAN VAN MALDEGEM et al – Lost, then found: transient forgetting in humans and machines
Forgetting can be permanent or transient. An intriguing, recently described form of transient forgetting (TF) in artificial neural networks is the stability gap: a network that has already learned a first task exhibits transient yet substantial forgetting when it begins additional training on a second task alongside the first. Could an analogous phenomenon be found in humans? Following a literature survey, six types of TF in humans were identified, categorised by their sources: learning, retrieval, spontaneous, overgeneralisation, task-switching, and multitasking. Although all differ in important ways from the stability gap, it is hypothesised that some underlying mechanisms are shared. This opinion article concludes by proposing experiments to test whether a 'stability gap-like' form of TF also occurs in humans.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(26)00237-8

Trends in Ecology and Evolution

PAPERS

ANDREW J. KING et al – Evolutionary spandrels in collective animal behaviour
Collective behaviour is widespread in the animal kingdom and can enhance individual fitness. Yet not all collective behaviours are adaptations. Instead, some may be nonadaptive or 'evolutionary spandrels'—traits that originated as by-products in the sense proposed by Stephen Jay Gould and Richard Lewontin. Here, we argue that self-organising processes provide a route through which evolutionary spandrels in collective animal behaviour can occur, and we provide three examples: spatial organisation in primate groups, division of labour in ants, and insect chorusing. We then consider how such outcomes may be co-opted into adaptive roles through exaptation and conclude by outlining the challenges associated with testing adaptive and nonadaptive hypotheses in collective behaviour research using individual-based studies, phylogenetic comparative analyses, and agent-based models.
https://www.cell.com/trends/ecology-evolution/abstract/S0169-5347(26)00209-0

DANIEL W. HART & NIGEL C. BENNETT – Inbreeding tolerance predicts mechanisms of socially induced infertility in vertebrates

In cooperatively breeding species, reproductively capable individuals often forgo breeding to assist others. This socially induced infertility is typically viewed as a consequence of cooperative breeding, yet the remarkable diversity of its mechanisms remains unexplained. We propose that cooperative living inevitably increases opportunities for reproduction among relatives, selecting for reproductive suppression to regulate the costs of inbreeding and reproductive conflict. Species-specific variation in inbreeding tolerance subsequently determines how suppression evolves. Where inbreeding tolerance is high, increased intragroup reproductive conflict favours strong physiological suppression of the hypothalamic–pituitary–gonadal axis to maintain social cohesion. Where inbreeding tolerance is low, behavioural mechanisms regulate reproduction while preserving reproductive competence. This framework explains mechanistic diversity and generates testable predictions across cooperative vertebrates.
https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(26)00184-9

Trends in Neurosciences

PAPERS

DASOM KWON, JIWOONG PARK & WON MOK SHIM – Constructing events across perception, action, and thought

The brain organizes continuous experience into events that structure episodic memory and guide behavior. Traditional accounts have primarily focused on sensory discontinuities and prediction errors that trigger updates of event models. Here, we broaden this view to consider event boundaries arising during goal-directed behavior, spontaneous thought, and memory recall, including transitions generated in the absence of corresponding changes in sensory input. We propose that prediction error and uncertainty provide complementary signals for event model updating: prediction errors signal a violation of current expectations, whereas uncertainty may promote updating when upcoming states become difficult to predict. We further suggest that the hippocampus may serve as a candidate hub linking boundary-related representational changes across perception, action, and thought. Together, this framework offers an integrative account of how the brain detects and generates event structure in continuous experience to support memory and behavior.
https://www.cell.com/trends/neurosciences/abstract/S0166-2236(26)00211-0

Trends Open

PAPERS

DISA SAUTER, ROZA KAMILOĞLU & RUI SUN – A computational ethology approach to the study of human behaviour

Predicting and understanding the how, when, and why of behaviour is a perennial challenge for psychologists. We argue that the scientific understanding of human behaviour can be accelerated by large-scale computational studies of observable behaviour in everyday contexts. Specifically, we propose a computational ethology approach: the systematic study of observable behaviour in real-world settings. Recent advances in computational methods allow for such studies to be scaled up by using video and audio recordings to map specific behaviours to ecologically relevant stimuli. We illustrate this approach by outlining a recent study that uses this method and by highlighting its advantages and challenges. In summary, we argue that the synthesis of ethology and computational methods offers unique potential for generating insights into the complexities of human behaviour in the wild.
https://www.cell.com/trends-open/fulltext/S3117-3470(26)00176-8

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