EAORC BULLETIN 1,184 – 22 February 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.

OTHER PUBLICATIONS – Artificial intelligence and illusions of understanding in scientific research

Nature 627, 49-58 (2024)

LISA MESSERI & M. J. CROCKETT – Artificial intelligence and illusions of understanding in scientific research

Scientists are enthusiastically imagining ways in which artificial intelligence (AI) tools might improve research. Why are AI tools so attractive and what are the risks of implementing them across the research pipeline? Here we develop a taxonomy of scientists' visions for AI, observing that their appeal comes from promises to improve productivity and objectivity by overcoming human shortcomings. But proposed AI solutions can also exploit our cognitive limitations, making us vulnerable to illusions of understanding in which we believe we understand more about the world than we actually do. Such illusions obscure the scientific community's ability to see the formation of scientific monocultures, in which some types of methods, questions and viewpoints come to dominate alternative approaches, making science less innovative and more vulnerable to errors. The proliferation of AI tools in science risks introducing a phase of scientific enquiry in which we produce more but understand less. By analysing the appeal of these tools, we provide a framework for advancing discussions of responsible knowledge production in the age of AI.
https://www.nature.com/articles/s41586-024-07146-0

NEWS

NATURE BRIEFING – The quest to understand consciousness

Inspired by his experiences with psychedelic substances, A World Appears is journalist Michael Pollan's personal account of a five-year quest to understand how scientists, philosophers and novelists explore the conscious experience. Through a series of interviews with experts, Pollan investigates theories of sentience, emotion, thought and 'the self' in organisms from plants to people. "I loved this literary account of Pollan's inconclusive yet insightful journey of discovery," says cognitive scientist Christof Koch, in his review.
https://www.nature.com/articles/d41586-026-00448-5

NEWS FROM SCIENCE – Squashed skulls found in China belong to first known East Asians

Revised dating of enigmatic Yunxian skulls pushes their age back 800,000 years, challenges idea of Denisovan ancestry.
https://www.science.org/content/article/squashed-skulls-found-china-belong-first-known-east-asians

NEWS FROM SCIENCE – This glass wafer could back up your phone—and last 10,000 years

Laser-written patterns on glass could store data for millennia at a time.
https://www.science.org/content/article/glass-wafer-could-back-your-phone-and-last-10-000-years

SCIENCEADVISER – Star Trek was right—glass hard drives could store data for millennia

Science fiction definitely saw this one coming. Writers for the Superman, Star Trek, and Mission Impossible franchises all dreamed up the idea of storing libraries of data in glass. Now, Microsoft researchers say they are bringing this vision closer to reality by storing nearly two terabytes (TB) of data—enough for hundreds of thousands of photos or hundreds of hours of

video—in coaster-size plates of glass. The new approach, described this week in Nature, could archive data for thousands of years, simply and cheaply.

Demand for long-term data storage is exploding, whether it's for cellphone pictures or data from giant telescopes or atom smashers. Worldwide, total installed data storage is expected to grow 10-fold by 2040, to more than 250 zettabytes, or 250 billion TB. Yet the dominant archive technologies are relatively short-lived and fragile. Magnetic tapes and hard disk drives typically decay within a decade. To keep data from being lost to time, they must be regularly overwritten or migrated to fresh archives, an expensive and time-consuming process.

One alternative idea is to convert digital bits of data into sequences of the four base pairs of DNA. A single gram of DNA can store hundreds of thousands of TB of data. But chemically synthesizing the DNA is expensive, and reading out the data with sequencing machines is slow. And although DNA can survive for centuries, it must be kept dry in sealed vials and protected from ultraviolet light.

Glass, in contrast, is cheap and abundant, and once data are stored, no energy is needed to preserve them. Perhaps most important, you can scratch, boil, or bake glass and the data remain intact. More than a decade ago, researchers showed lasers could write and read large volumes of data in glass. Still, the approach required pure and expensive fused-silica glass and four microscopes working in tandem to read out the data.

Now, Microsoft researchers report switching to borosilicate glass, a standard kind used in cookware and lab flasks. It can't store as much data. But the new setup is simpler to read and write. As a result, "it should have an easier path to market," said optoelectronics expert Peter Kazansky, who helped pioneer the field of glass data storage.

https://www.science.org/content/article/glass-wafer-could-back-your-phone-and-last-10-000-years

SCIENCEADVISER – Anthropologists butt heads over crushed skulls

Two crushed skulls found in China were thought to be about a million years old, but in a new analysis, a different dating technique suggests they're nearly 800,000 years older. The revised date clashes with some anthropologists' assertion that the skulls are part of the Denisovan lineage (Homo longi), rather than H. erectus, as they'd been previously considered. "If this is H. erectus at this time and in this part of the world, it's exactly what we would expect," one expert noted. "If it's H. longi, it would be extremely curious."

https://www.science.org/doi/10.1126/sciadv.ady2270

SCIENCEADVISER – How gibbons got their groove back

The Hainan gibbon is the rarest primate on Earth and had been spiraling towards extinction for decades. In the 1950s, roughly 2,000 lived on China's Hainan Island, and by 2003, only 13 remained. But the population is making a comeback: today, there are 42. And although conservation efforts have helped, a new genomic study suggests that the species' rebound may also owe something to its genetic history.

Researchers sequenced genomes extracted from fecal samples collected from 18 wild gibbons alongside DNA from museum specimens. In such a tiny population, they expected a high accumulation of harmful mutations from severe inbreeding. Instead, researchers found that although Hainan gibbons have extremely low genetic diversity, they show surprisingly low levels of inbreeding and relatively few harmful mutations.

To understand this apparent contradiction, the team reconstructed the species' long-term demographic history. During the Last Glacial Maximum, the coldest phase of the last ice age about 20,000 years ago, the species underwent a severe bottleneck, meaning its population shrank drastically. It then expanded for thousands of years, peaking around 5,000 years ago.

When populations rebound after crashing, harmful mutations that accumulated during the bottleneck can be weeded out. Over generations, the gibbons appear to have shed some of their most damaging genetic baggage. Frequent recombination, the natural reshuffling of DNA during reproduction, helped break up clusters of harmful variants, while natural selection preserved genes that remained useful.

The study also uncovered two previously hidden genetic lineages within today's tiny population. In recent years, as new family groups formed, individuals from those lineages began mating with one another. Their offspring showed higher genetic diversity than either parent. Computer simulations suggest that if this mixing continues, it could substantially reduce the species' extinction risk over the next century.

As the authors write, the study "highlights the importance of understanding demographic history, genome architecture, and behavioral regulation in the protection of threatened primates."

https://www.science.org/doi/10.1126/sciadv.adw3298

SCIENCEADVISER – Even baby chickens match sounds to shapes

Imagine you are presented with two shapes: one blobby and rounded, the other spiky. Which do you think is named "bouba," and which is named "kiki"? People around the world, regardless of culture or linguistic background, tend to associate the pseudo-word "bouba" with rounded shapes and "kiki" with pointed ones—a trend that holds true for infants as young as four months old. Could this phenomenon reveal the origins of human language?

Scientists have failed to find evidence of the bouba-kiki effect in great apes, suggesting a link to some uniquely human ability. In a new study, researchers experimented with newly hatched baby chickens, ensuring that any observed associations between sounds and shapes would be innate rather than influenced by experience. "The moment they came out of the egg, they had a little time to dry, and then they were immediately tested ," lead author Maria Loconsole told Science podcast host Sarah Crespi. Surprisingly, when three-day-old and one-day-old chicks heard a recording of a human saying "bouba," they were far more likely to approach and explore a panel with a rounded shape as opposed to a spiky shape. When the birds heard "kiki," however, they tended to go for the jagged shape instead.

The results suggest that the bouba-kiki effect has deep evolutionary roots. As linguistics researchers Marcus Perlman and Bodo Winter write in a related Science Perspective, many animals may be born "with a predisposition to map certain kinds of sounds with certain kinds of visual stimuli."

https://www.science.org/doi/10.1126/science.adq7188

THE CONVERSATION – Childhood apraxia of speech: when the brain can't plan the words

This rare speech motor disorder prevents effective speech planning, leaving some children persistently difficult to understand without specialist support.

https://theconversation.com/childhood-apraxia-of-speech-when-the-brain-cant-plan-the-words-271266

PUBLICATIONS

Current Biology

PAPERS

YIXIANG SHAN et al – Evolution of competitiveness during wheat domestication

Crop domestication involved adaptation of wild plants to human exploitation, but the underlying selection mechanisms remain unclear. Archaeological evidence from the best-studied regions shows domestication occurring across a diffuse region and protracted period of at least 1,000–2,000 years, consistent with a co-evolutionary process. For seed enlargement, both theory and empirical evidence indicate an unintentional evolutionary mechanism, potentially acting via an ecological process such as competition, but this remains unproven. Here, we used real and virtual experiments to test the hypothesis that cultivation selected for stronger competitive ability in wheats. First, we compared three independent domestication events across wheat species, showing that domesticated landraces were stronger competitors than their wild counterparts. Model simulations reproduced this finding, showing that competitiveness increased through larger, more erect leaves and greater apical dominance. A second experiment compared wild, landrace, and elite durum wheats, finding that stronger competitiveness arose early during domestication but has been reversed by modern breeding. Simulations showed that weaker competitiveness in modern varieties arose from smaller leaves and shorter internodes. Our work indicates that competition selected for domestication traits responsible for wheat canopy growth and architecture, resulting in competitive landrace phenotypes unsuitable for conventional modern agriculture.

https://www.cell.com/current-biology/abstract/S0960-9822(26)00132-6

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eLife

PAPERS

MATTHEW SCHAFER et al – Neural Trajectories of Conceptually Related Events

In a series of conceptually related episodes, meaning arises from the link between these events rather than from each event individually. How does the brain keep track of conceptually related sequences of events (i.e., conceptual trajectories)? In a particular kind of conceptual trajectory—a social relationship—meaning arises from a specific sequence of interactions. To test whether such abstract sequences are neurally tracked, we had participants complete a naturalistic narrative-based social interaction game, during functional magnetic resonance imaging. We modeled the simulated relationships as trajectories through an abstract affiliation and power space. Using two independent samples (n = 50), we found evidence of both the underlying social dimensions of affiliation and power and the evolving social relationships themselves as being tracked by the hippocampus. These results suggest that our evolving relationships with others, despite being composed of isolated events that occur independently across time and space (i.e., spatially and temporally non-consecutive events), but are nevertheless related conceptually, are represented in trajectory-like neural patterns in the human hippocampus.

https://elifesciences.org/reviewed-preprints/96895

Evolutionary Human Sciences

PAPERS

RONY KARSTADT et al – Transmission of human handedness: a reanalysis

Human handedness results from the interplay of genetic and cultural influences. A gene-culture co-evolutionary model for handedness was introduced by Laland et al. (1995), and the present study generalizes that model and the related analysis. We address ambiguities in the original methodology, particularly regarding maximum-likelihood estimation, and incorporate sex differences in cultural transmission. By fitting this extended framework to existing familial and twin datasets, we

demonstrate that accounting for criterion shifts significantly improves model fit and parameter estimation accuracy. We find stronger maternal than paternal effects on handedness, with daughters exhibiting greater sensitivity to these effects than sons. We provide an open-source Python implementation of the model, which is a robust platform for comparing gene-culture models and applying them to diverse datasets.
https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/transmission-of-human-handedness-a-reanalysis/F99626F8E129AC2794F3A0809447CC37

Frontiers in Language Sciences

PAPERS

ISABELLE CHARNAVEL & DOMINIQUE SPORTICHE – On semantic agreement

We discuss semantic agreement, cases in which agreement between a head and a DP seems to drive, or be driven by, interpretive properties of this DP rather than its syntactic properties. This discussion centers mostly on the case of subject/verb number and person agreement (but its conclusions would extend to other cases of agreement between a head and a DP). In such a configuration, semantic agreement occurs in cases in which the feature values on T do not seem to match the feature values of its DP subject. More specifically, we conclude that features on agreeing heads can and sometimes must be semantically interpretable. In such cases, the values of the features on T can target the denotational properties of its DP subject, instead of its phi (ϕ)-feature (values): they can or must trigger a presupposition about this DP subject's denotation.
https://www.frontiersin.org/journals/language-sciences/articles/10.3389/flang.2026.1625397/full

Frontiers in Psychology

PAPERS

LI ZHANG & ZAISHU MO – Cognitive linguistics approach to the representation of knowledge contents in college English textbooks

This paper proposes a metaphor-based textbook analysis model from a macroscopic perspective and abstracts it with the "Source–Path–Goal (SPG)" image schema. Seeking new insights from cognitive linguistic theory, as well as conceptual metaphor theory (CMT), this research probes into the source, path, and goal of the metaphorical representation of knowledge contents in a series of college English textbooks in China. With the construction of a self-built textbook corpus and the aid of an online corpus annotation tool, qualitative content analysis was carried out to uncover the metaphorical representations in the textbook texts and tasks. Findings show that first, the conceptual metaphors in the texts and the metaphorical analogical reasoning in tasks are considered in the analysis model as "Source." Second, structured design including the "hourglass" pattern in the unit design is the "Path" of knowledge representation in the textbooks. Third, the functions of these metaphorical representations are discussed as the "goal" of the knowledge representations in the textbooks, which is the realization of competence development as the textbooks' teaching objectives. Since conceptual metaphor theory puts forward a universality of metaphors, the case study is not only typical in the Chinese context but also potentially informative beyond it.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2026.1749701/full

HASSANE KISSANE et al – Cognitive dynamics of verb-particle constructions: an eye-tracking study on phrasal verbs and verb-preposition combinations

This study investigates the cognitive processing of verb-particle constructions (VPCs) using eye-tracking data to explore how English native speakers process different types of the sequence noun phrase (NP)-verb-particle-NP during reading tasks. While previous research has focused on phrasal verbs, our study extends this examination to include patterns with prepositions, aiming to identify distinct cognitive engagement patterns and processing efficiencies associated with each. We employed the Provo Corpus to analyze eye movements while participants read sentences containing these constructions, focusing on metrics such as first fixation duration, gaze duration, go-past times, and total reading times. Our findings indicate similarities in the lexical verbs, and significant differences in particles, indicating how these two types of constructions are processed, with phrasal verbs sometimes processed more efficiently than the prepositional counterparts. This suggests that phrasal verbs might be more deeply entrenched in the linguistic repertoire of native speakers, possibly functioning as single lexical units. However, larger and more systematically controlled item sets are needed to test the generality of this interpretation. This research contributes to the understanding of complex structures processing and the cognitive mechanisms that support it, offering insights that could influence linguistic theory and language education.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2026.1676341/full

XUE KUANG et al – Language, silence, and logic: Zen, Nishida, and fthe Sapir-Whorf hypothesis in cognitive and cultural perspectives

This study employs a weakened version of the Sapir-Whorf hypothesis as its analytical framework. Through comparative conceptual analysis, it examines Zen Buddhism's nonverbal practices (koans and silence) and Nishida Kitaro's dialectical philosophy of language (pure experience, absolute contradictory self-identity, and the logic of place) as two core conceptual

cases. It proposes and argues for a "Middle Way" theoretical framework that integrates silence with dialectical expression. This framework acknowledges the habitual shaping of cognition by linguistic structures while elucidating how Zen Buddhism, through the radical suspension of language, and Nishida, through dialectical reconstruction within language, complementarily transcend the cognitive limitations revealed by linguistic relativism. This study offers a novel theoretical model grounded in Eastern philosophy for linguistic science and cross-cultural psychology. It demonstrates its operational potential in cross-cultural education through an illustrative pedagogical case study (presented as a qualitative teaching narrative).
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2026.1638010/full

HGG Advances
PAPERS
ALYSSA C. SCARTOZZI et al – Genome-wide investigation of prosody perception: evidence for shared genetic influences between speech rhythm, musical rhythm, and reading traits.
Prosody perception is an often overlooked aspect of human language despite its importance in facilitating spoken language comprehension. Sensitivity to prosodic cues varies between individuals, and prosody perception skills are shown to be associated with various language- and reading-related outcomes. Despite the importance of prosody perception in human communication, its underlying biology is poorly understood. The current study investigates the genetic architecture of prosody (speech rhythm) perception and explores its evolutionary roots. We conducted a GWAS of prosody (N = 1,501) as measured by scores on the Test of Prosody via Syllable Emphasis ("TOPsy"). GWAS results yielded 14 suggestive significant signals (p-value < 5.00 x 10-6). Gene-set enrichment analysis identified shared genetic architecture between human prosody perception and key vocal learning brain regions in songbirds, suggesting that human prosody perception may have evolutionary convergence in communication mechanisms in animal vocal learning. Additionally, cross-trait polygenic score analyses suggests shared genetic influences between prosody perception and both word reading and musical beat synchronization, emphasizing how genetics influence prosody perception and its associations with communication-, education-, and music-related traits. These initial efforts could inform advances in communication sciences and disorders as well as educational contexts.
https://www.cell.com/hgg-advances/fulltext/S2666-2477(26)00021-7

Journal of the Royal Society Interface
PAPERS
ZHAO SONG et al – Non-participant externalities reshape the evolution of altruistic punishment
Understanding the evolutionary origins of altruistic punishment, a critical mechanism sustaining cooperation, remains a central challenge in behavioural science. Voluntary participation is considered a powerful approach that enables its emergence, but its explanatory power typically rests on the common assumption that non-participants have no impact on the public good. Yet, given the decentralized nature of voluntary participation, opting out does not necessarily preclude individuals from influencing the public good. Here, we revisit the role of voluntary participation by allowing non-participants to exert either positive or negative impacts on the public good. Using evolutionary analysis in a well-mixed finite population, we find that positive externalities from non-participants lower the synergy threshold required for altruistic punishment to dominate. In contrast, negative externalities raise this threshold, making altruistic punishment harder to sustain. Notably, when non-participants have positive impacts, altruistic punishment thrives only if non-participation is incentivized, whereas under negative impacts, it can persist even when non-participation is discouraged. Our findings reveal that efforts to promote altruistic punishment must account for the active role of non-participants, whose influence can make or break collective outcomes.
https://royalsocietypublishing.org/rsif/article/23/235/20250820/480379/Non-participant-externalities-reshape-the

Nature
PAPERS
JULIA HAAS et al – A roadmap for evaluating moral competence in large language models
The question of whether large language models (LLMs) can exhibit moral capabilities is of growing interest and urgency, as these systems are deployed in sensitive roles such as companionship and medical advising, and will increasingly be tasked with making decisions and taking actions on behalf of humans. These trends require moving beyond evaluating for mere moral performance, the ability to produce morally appropriate outputs, to evaluating for moral competence, the ability to produce morally appropriate outputs based on morally relevant considerations. Assessing moral competence is critical for predicting future model behaviour, establishing appropriate public trust and justifying moral attributions. However, both the unique architectures of LLMs and the complexity of morality itself introduce fundamental challenges. Here we identify three such challenges: the facsimile problem, whereby models may imitate reasoning without genuine understanding; moral multidimensionality, whereby moral decisions are influenced by a range of context-sensitive relevant moral and non-moral considerations; and moral pluralism, which demands a new standard for globally deployed artificial intelligence. We provide a roadmap for tackling these challenges, advocating for a suite of adversarial and confirmatory evaluations that will enable us

to work towards a more scientifically grounded understanding and, in turn, a more responsible attribution of moral competence to LLMs.

https://www.nature.com/articles/s41586-025-10021-1

Nature Communications Biology

PAPERS

TORGEIR MOBERGET et al – The genetic architecture of human cerebellar morphology supports a key role for the cerebellum in human evolution and psychopathology

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 functional domain of the cerebellum has expanded beyond motor control to also include cognitive and affective functions. In line with this notion, cerebellar volume has increased over recent primate evolution, and cerebellar alterations have been linked to heritable mental disorders. To map the genetic architecture of human cerebellar morphology, we here studied a large imaging genetics sample from the UK Biobank (n discovery = 27,302; n replication: 11,264) with state-of-the art neuroimaging and biostatistics tools. Multivariate GWAS on regional cerebellar MRI features yielded 351 significant genetic loci (226 novel, 94% replicated). Lead SNPs showed positive enrichment for relatively recent genetic mutations over the last 20-40k years (i.e., overlapping the Upper Paleolithic, a period characterized by rapid cultural evolution), while gene level analyses revealed enrichment for human-specific evolution over the last ~6-8 million years. Finally, we observed genetic overlap with major mental disorders, supporting cerebellar involvement in psychopathology.

https://www.nature.com/articles/s42003-026-09664-1

DERRY TAYLOR, TINA PETERSEN, CATHERINE CROCKFORD & ROMAN M. WITTIG – Measuring hierarchical structure across hominid percussive tool-use sequences

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.

Understanding the evolution of animal cognitive capacities requires us to study their full range of naturally occurring sequences of behavior. It has long been theorized that cognitive capacities are revealed through the sequential structure of natural behavior, particularly its hierarchical organization. Progress in understanding the origins of this capacity has, however, been limited by a lack of techniques for identifying and measuring hierarchical structure in behavioral sequences. To fill this methodological gap, we introduce here an analysis pipeline for measuring hierarchical structure in sequential behavior. We then establish the validity of our approach by first applying it to chimpanzee percussive tool-use (PTU) sequences and comparing it to markov-simulated control sequences. Secondly, we apply our analysis to a dataset on PTU in humans and compare the hierarchical complexity of chimpanzee and human PTU. Despite decades of speculation, our study is the first empirical demonstration of hierarchical structuring in chimpanzee tool-use. We found chimpanzee PTU is characterized by a level of hierarchical complexity beyond that which can be generated through markov process, but is nonetheless systematically less hierarchically complex than human PTU, as expected. Altogether, our analyses demonstrate the potential for our approach to successfully detect and measure hierarchical structuring in natural sequences of behavior, which we believe will play a pivotal role in shedding light on old questions, as well as opening up entirely new lines of inquiry in the study of human and animal behavior.

https://www.nature.com/articles/s42003-026-09633-8

Nature Machine Intelligence

PAPERS

MENOUA KESHISHIAN et al – Parallel hierarchical encoding of linguistic representations in the human auditory cortex and recurrent automatic speech recognition systems

Transforming continuous acoustic speech signals into discrete linguistic meaning is a remarkable computational feat accomplished by both the human brain and modern artificial intelligence. A key scientific question is whether these biological and artificial systems, despite their different architectures, converge on similar strategies to solve this challenge. Although automatic speech recognition systems now achieve human-level performance, research on their parallels with the brain has been limited by biologically implausible, non-causal models and comparisons that stop at predicting brain activity without detailing the alignment of the underlying representations. Furthermore, studies using text-based models overlook the crucial acoustic stages of speech processing. Here we bridge these gaps by uncovering a striking correspondence between the brain's processing hierarchy and the model's internal representations using high-resolution intracranial recordings and a causal, recurrent automatic speech recognition model. Specifically, we demonstrate a deep alignment in their algorithmic approach: neural activity in distinct cortical regions maps topographically to corresponding model layers, and critically, the representational content at each stage follows a parallel progression from acoustic to phonetic, lexical and semantic information. This work thus moves beyond demonstrating simple model–brain alignment to specifying the shared underlying

representations at each stage of processing, providing direct evidence that both systems converge on a similar computational strategy for transforming sound into meaning.
https://www.nature.com/articles/s42256-026-01185-0

Nature Reviews Neuroscience
PAPERS
ALI MAHMOODI & MATTHEW F. S. RUSHWORTH – Computational origins of cortical brain circuits for social cognition
No domain rivals the importance and complexity of our social lives. Given the principle of exaptation in biology — the repurposing of existing structures for new functions — it is likely that brain regions originally evolved to perform computations in one context have been recruited for related computations in other contexts. From this point of view, brain regions for supporting social cognition should also be active in non-social contexts in which the computational demands mirror those of social situations. In this Perspective, we examine the computations required to navigate the social lives of human and non-human primates and identify brain activity patterns responsible for these functions, assessing the degree to which similar activity carries out similar computations in non-social contexts with analogous computational demands. This approach offers a unifying framework that bridges social and non-social domains and has implications for multiple areas within cognitive neuroscience, as well as emerging fields such as human–artificial agent interactions.
https://www.nature.com/articles/s41583-026-01028-2

Nature Reviews Psychology
PAPERS
KARIM BETTACHE – The culture-to-cognition transmission of inequality and the psychological necessity of consciousness-raising
A defining fault line in contemporary Western societies centres on consciousness-raising interventions aimed at addressing social inequities — approaches often dismissed as 'woke' — that can generate intense polarization and backlash. In this Review, I apply a cultural-psychological framework to understand both the psychological necessity of consciousness-raising interventions and the predictable resistance they trigger. Specifically, I demonstrate how harmful cultural schemas become embedded in cognitive processes through participation in cultural systems. These schemas shape perception, identity and behaviour in ways that produce and reproduce social inequality and can cause psychological harm, particularly for individuals from marginalized groups. Thus, consciousness-raising approaches reflect a necessary response to harmful psychological processes that occur as minds develop within culturally stratified contexts. I also explain how resistance to consciousness-raising interventions is a predictable psychological reaction to schema disruption rather than a political reaction. By reframing this societal fault line through the lens of cultural psychology, this analysis moves beyond polarized political discourse towards a more empirically grounded understanding of societal tensions and how they might be ameliorated.
https://www.nature.com/articles/s44159-026-00541-6

JUDITH HOLLER & ANNA K. KUHLEN – Psycholinguistic perspectives on face-to-face conversation
Traditional psycholinguistic approaches to language have examined production and comprehension in isolation. However, these processes are tightly intertwined and embedded in social interactions. In this Review, we summarize empirical work that highlights the behavioural and cognitive complexities of communicating meaning in face-to-face conversation and that should be captured by psycholinguistic accounts and paradigms. To begin, we consider the implications of conceptualizing language as a situated joint action. Then, we summarize work on three defining features of conversation. First, visual bodily signals play an integral role in composing and comprehending meaning and achieving mutual understanding. Second, addressee feedback signals understanding or difficulty understanding, and the monitoring of interlocutors for such signals adds demands on cognitive resources. Third, multi-party interactions require participants to keep track of and adapt to multiple people's understanding, signals and shared knowledge. In closing, we point to issues that require further research and the development of experimental paradigms that can capture defining features of face-to-face conversation while maintaining experimental control.
https://www.nature.com/articles/s44159-026-00538-1

Nature Scientific Reports
PAPERS
ANNE DELAGNES et al – A regional-scale mobility model for the early hominin occupation of the Lower Omo Valley (Ethiopia)
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 ability of early hominins to adapt to diverse landscapes and ecological niches was a key factor in their range expansion. However, the behavioral and cognitive prerequisites underlying this adaptability remain poorly understood. Assuming that resource procurement played a pivotal role in hominin dispersal, we investigate the mobility-subsistence system of early

Oldowan groups who occupied the Lower Omo landscape of southern Ethiopia some 2.3 million years ago (Ma). With its extensive archaeological record and scattered lithic resources, this context provides a landscape-scale record of early hominin behavior. Multiple lines of evidence derived from an integrated environmental, spatial and technological analysis indicate a regionally-structured mobility strategy, involving the provisioning of quartz pebbles and the transport of partially transformed products from distant sources to the biotic-rich but stone-poor margins of the paleo-Omo River, where highly mobile foraging activities were concentrated along the meandering channel. This regional strategy of early hominin displacement reflects a "Shungura exception" in the Early Pleistocene record. It coincides with the emergence of stone tool-mediated activities in the Lower Omo Valley, marking a tipping point in the capacity of early hominins to develop environment-specific adaptive strategies–a crucial asset for their expansion into new ecological niches.
https://www.nature.com/articles/s41598-026-39972-9

ROB DESALLE et al with IAN TATTERSALL – Natural selection and language genes in humans
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.
In this study we construct lists of candidate genes for articulate language. Analysis of coding regions of over 100 candidate genes for the effects of natural selection (directional episodic selection and relaxed/intensified selection) in the various lineages of primates (thirty-four nonhuman primate species, plus Homo sapiens Neanderthals and Denisovans) revealed a burst of altered selection effects on neural genes at the node leading to the Homo sapiens-Neanderthal-Denisova triad, followed by bursts of selection effects on neural genes related to language in both the Denisovan and Neanderthal lineages. Those latter increases in involvement of neural genes in Neanderthals and Denisovans can be contrasted with the missing or slight response to selection on those same genes in the H. sapiens lineage. The genes involved in these bursts can mostly be classified as involved in synapse structure and maintenance. We develop a hypothesis for how synaptic efficiency could be related to language acquisition in these lineages.
https://www.nature.com/articles/s41598-026-39032-2

New Scientist
NEWS
We finally know why humans are the only primates with a chin
Biologists have debated the reason why Homo sapiens evolved a prominent lower jaw, but a new study suggests this unique feature may actually be a by-product of other traits shaped by natural selection.
https://www.newscientist.com/article/2515693-humans-are-the-only-primates-with-a-chin-now-we-finally-know-why/

Accidental discovery hints at mystery structures within our brain
Scientists may have stumbled across a network of vessels in the brain that helps clear out waste fluid – a discovery that could "represent a paradigm shift in our understanding of all neurodegenerative diseases".
https://www.newscientist.com/article/2515542-accidental-discovery-hints-at-mystery-structures-within-our-brain/

ARTICLES
LEGO EDUCATION – Find out how play builds better minds
Rote learning won't cut it in the 21st century. Discover how "active play" helps children build the creative innovation and critical thinking skills they need to thrive in the modern automated world.
https://www.newscientist.com/article/2512853-how-play-builds-creative-minds/

MICHAEL MARSHALL – The untold story of our remarkable hands and how they made us human
For decades, the evolutionary path that led to our dexterity has been impossible to grasp. Now, thanks to a string of new discoveries, it is finally possible to sketch out the story of how our incredible hands came to be.
https://www.newscientist.com/article/2514431-the-untold-story-of-our-remarkable-hands-and-how-they-made-us-human/

ROWAN HOOPER, PENNY SARCHET & MAGGIE ADERIN – How ancient humans crossed the vast ocean
Podcast
More than 8500 years ago, ancient people crossed the ocean to the remote island of Malta for the first time. On the podcast this week, we discuss the many examples of prehistoric seafaring – and what this all tells us about ancient minds.
https://www.newscientist.com/podcasts/

ANNALEE NEWITZ – Why it's high time we stopped anthropomorphising ants
We have long drawn parallels between ants and humans. Now we are comparing the insects to computers. It is time to stop using ants as analogues for ourselves and our machines.

{"Ants as analogues" … and there's the problem: what is an analogue? I would describe it as "something that has some, but not all, features in common with the original thing, where the common features are currently the focus of attention". Newitz's focus of attention is the possibility of ants being rejected by their nestmates because city ozone degrades their hydrocarbons, and a fear that this human change to the chemical environment will wipe out ants. Yet pavement ants (Lasius spp, Tetramorium spp, Formica spp) are still at pest levels in our cities – any effect on their frequency is, from a human viewpoint, still insufficient. I think ants are wonderful, but I recognise that wonderfulness is not a pervasive feature of the ant-human interface. I think her attack on the anthropomorphic reaction to ants is … anthropomorphic?}
https://www.newscientist.com/article/mg26935834-100-why-its-high-time-we-stopped-anthropomorphising-ants/

One Earth

PAPERS

TÚLIO ANDRADE et al – Agency and values for transformative change
Social tipping points are moments when targeted interventions in collective behavior can trigger transformative shifts across society. Embedded in complex social-ecological systems, these tipping points have the potential to drive rapid, systemic change, addressing urgent challenges such as climate change, biodiversity loss, and social inequality but also leading to negative or unintended consequences if not carefully guided. This Voices asks: how can we leverage social tipping points for good?
https://www.cell.com/one-earth/fulltext/S2590-3322(26)00019-9

PLoS One

PAPERS

ALEXANDRA MAYN & VERA DEMBERG – Sources of individual variability in a pragmatic reference game: Effects of logical reasoning and Theory of Mind
While in theory people are expected to adhere to rational communicative principles, a growing body of work shows that people vary widely in their tendency to draw pragmatic inferences. It has been suggested that these differences may, in part, stem from depth of reasoning: Previous work has shown that individual participants' response patterns in a pragmatic reference game are predicted by three probabilistic pragmatic models of different reasoning depth. However, those models are agnostic to the cognitive traits which underlie those differences. In this study, we systematically investigate sources of individual variation in a pragmatic reference game, where participants are required to draw ad-hoc implicatures of various complexity. We relate the observed variability in reference game performance to cognitive traits, specifically logical reasoning ability, working memory and Theory of Mind, as well as to the strategies reported by participants. We find a positive effect of logical reasoning and Theory of Mind on pragmatic inference. We do not find evidence for an effect of working memory.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0339899

AKANE OHASHI & HIROSHI NITTONO – Beyond the baby schema: Objects being touched are perceived to be cute
Research on cuteness has traditionally focused on the baby schema, which is used to describe the physical characteristics of an individual. Recent research, however, has shown that the characteristics of interactions between individuals, such as physical contact and social relationships, can also be perceived as cute (or kawaii in Japanese) and evoke a special feeling associated with its perception. In this study, we aimed to examine the influence of seeing an object being touched by another person on impressions of cuteness or kawaii by manipulating the level of the baby schema features. Online surveys were conducted in Japan (n = 198) and the United States (n = 199). Participants were presented with four photographs depicting a person holding or not holding an object with high or low baby schema features and were asked to rate their feelings of cuteness or kawaii toward the object. In addition, following the procedures of previous research, they were asked to report their impression of the person in the photograph and their guess about how the person felt about the object. The results showed that the objects with higher baby schema features and the objects being touched were rated as cuter or more kawaii. These effects did not interact. Similar effects were observed for the cuteness ratings of the person and guesses about the person's feelings. The present study suggests that the perceived cuteness of an object is influenced not only by its baby schema characteristics but also by factors such as physical contact or the relationship between the entities.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0340903

PNAS

PAPERS

STEFAN THURNER, MARKUS HOFER & JAN KORBEL – Why more social interactions lead to more polarization in societies
Over the past two decades, the number of close social connections increased substantially, at least by a factor of two. At the same time, societal opinions have become increasingly polarized in many Western countries. To explore whether these trends could be connected, we employ a simple computational model of society, where people—within their social networks—continuously compare and update their opinions. Here, we show that the model that is known to realistically

capture both homophily and social balance exhibits a phase transition phenomenon where, above a critical social connectivity, an explosive transition toward strong polarization must occur. The model allows us to understand the empirical inflation of polarization during the last decades as a function of the observed increased values of social connectivity. In the presence of a small fraction of synchronized influencers, the transition becomes continuous; however, polarization then appears at lower connectivities. We discuss the implications of the presence of a phase transition in social polarization.
https://www.pnas.org/doi/full/10.1073/pnas.2517530122

COMMENTARIES

BEATE VÖLKER, RENSE CORTEN & GERALD MOLLENHORST – More social interactions, more polarization? The evidence is not there

Thurner et al., hereafter THK present a computational model and empirical analysis arguing that a [contested] rise in political polarization in Western countries stems from increased social connectivity. Their model is a novel contribution, and they commendably confront their model with data. However, as an empirical claim about contemporary societies, the model's explanatory power rests on unsupported premises and thus overreaches.
https://www.pnas.org/doi/full/10.1073/pnas.2533120123

STEFAN THURNER, MARKUS HOFER & JAN KORBEL – Reply to Völker et al.: On the evidence of increased close friendships in societies

Commentators on ref. 1 argue that a rapid and strong social connectivity increase is not supported by data. Their critique focuses on data presented in Fig. 1E. To find out if close friendship ties, strong enough to affect the opinions of friends, increase over time, we compiled available surveys that meet carefully chosen selection criteria, specified in SI Appendix. The commentators present datasets that do not match these criteria to conclude that our results are unsupported. We discuss this problematic reasoning along with their arguments.
https://www.pnas.org/doi/full/10.1073/pnas.2535183123

Proceedings of the Royal Society B

PAPERS

TIINA MARIA MATTILA et al – Genetic relatedness mattered in the co-burial ritual of Neolithic hunter–gatherers

Kin relations among past societies can offer valuable information about the social dynamics of the population. Genetic data from prehistoric human remains can reveal genetic relatedness, and when combined with archaeological information, shed light on social factors shaping ancient communities. However, accessing such information on ancient hunter–gatherer societies has been challenging owing to the scarcity of temporally overlapping multi-burial sites. Here, we focused on the Pitted Ware Culture (PWC) cemetery from Ajvide (Gotland, Sweden), one of Stone Age Europe's largest and best-preserved hunter–gatherer burial grounds of the European Stone Age. We generated new genomic data from 10 individuals, primarily from co-burial contexts, and combined these with published genomes from 24 individuals across four PWC sites on Gotland. The genetic analyses revealed dual ancestry of the Gotlandic PWC, showing approximately 80% ancestry associated with earlier Mesolithic hunter–gatherer groups and 20% with farmer groups. We also identified close genetic relatives between the different studied PWC sites on Gotland, indicating mixing of the groups. All individuals buried together were closely related to one another, including first-, second- and third-degree relatives, and showed significantly elevated genetic relatedness. This demonstrates that genetic relatedness played a defining role in the co-burial ritual and extended beyond first-degree relatives.
https://royalsocietypublishing.org/rspb/article/293/2065/20250813/480372/Genetic-relatedness-mattered-in-the-co-burial

JOSEFIEN A. TANKINK et al with CAREL P. VAN SCHAIK & REDOUAN BSHARY – Making friends in an asymmetric game: the establishment of male–female grooming exchanges in vervet monkeys

An important challenge for individuals of group-living species is to build cooperative relationships with new partners. One famous strategy for doing so is 'raise the stakes', proposing low initial investments that increase if the partner matches these investments in a series of exchanges. Contrarily, the 'all in' strategy predicts high initial investment that may be maintained, but downregulated if not fully matched. We tested these predictions on grooming exchanges between wild male–female vervet monkeys, a species with regular male dispersal. Contrary to model predictions, we found uneven initial investment between novel partners that reached near reciprocity after approximately 6 months. To identify which sex altered investment, we examined grooming durations and frequencies of novel and established partners. Females showed consistently high initial investment and gradually reduced grooming over the first 6 months. Males did not alter grooming duration but had higher grooming frequency after a year of residency. Eventually, grooming exchanges nearly evened out. Female behaviour aligns more closely with the 'all in' strategy, which suggests competition among female groups over dispersing males. Male behaviour partly fits the 'raise the stakes' hypothesis. The study highlights the complexity of real-life cooperation, emphasizing the need to explicitly incorporate life history parameters to understand cooperative strategies.
https://royalsocietypublishing.org/rspb/article/293/2065/20252794/480366/Making-friends-in-an-asymmetric-game-the

AHRA KO et al – Fundamental social motives in men and women across 42 societies

Humans rely on a suite of fundamental social motives to navigate recurring adaptive challenges. Using data from 14 532 participants across 42 societies, we examine sex similarities and differences in the strength of these motives across adulthood and sociocultural contexts, employing generalized additive models that account for spatial autocorrelation. Across societies, women reported stronger motivation for threat avoidance, long-term pair bonding and caregiving, while men reported stronger motivation for status and mate-seeking. These sex differences were largest among individuals in committed partnerships without children but were smallest—approximately halved—among parents. Men who were fathers reported motivational profiles more oriented towards protection and caregiving, aligning more closely with women's profiles in ways suggesting a shared parental care strategy. However, fathers also reported amplified status motivation relative to mothers, suggesting a sex-differentiated strategy that may complement caregiving through resource provision. Notably, sex differences in motive strength are maintained or even amplified in societies with greater gender equality, suggesting that such contexts may facilitate fuller expression of sex-linked motivational patterns. These findings highlight how fundamental social motives reflect sex-specific calibration and vary across life phases and sociocultural conditions that shape human social behaviour.

https://royalsocietypublishing.org/rspb/article/293/2065/20251970/480364/Fundamental-social-motives-in-men-and-women-across

Royal Society Open Science

PAPERS

MAXIMILIAN FRANK et al – Error needs culture! Exploring the relationship between error culture and openness

In this article, we examine the role of errors in data-driven research and assess the extent to which a lack of a constructive error culture has been addressed across various research fields. Motivated by recurring calls in the research data management community for clearer guidance, it presents examples of how scientific communities have addressed problems related to 'flawed research'—a term we use to describe research acts that lead to wrong and unreliable results. Furthermore, it highlights observations on how error culture in science can positively impact the research process. We demonstrate that error culture both benefits from suitable infrastructures and depends on their support to spread. This creates a reciprocal relationship between error culture, transparency and open science. Consequently, we argue that errors themselves do not hinder the progress of scientific knowledge. Instead, it is the way they are subsequently dealt with that poses a challenge. Moreover, data sharing and open science practices can be fostered by developing an error culture in each disciplinary context.

https://royalsocietypublishing.org/rsos/article/13/2/242233/480374/Error-needs-culture-Exploring-the-relationship

Science

PAPERS

MARIA LOCONSOLE, SILVIA BENAVIDES-VARELA & LUCIA REGOLIN – Matching sounds to shapes: Evidence of the bouba-kiki effect in naïve baby chicks

Humans across multiple languages spontaneously associate the nonwords "kiki" and "bouba" with spiky and round shapes, respectively, a phenomenon named the bouba-kiki effect. To explore the origin of this association, and whether it is unique to humans, we tested the bouba-kiki effect in baby domestic chickens (Gallus gallus). As a precocial species, chicks can be tested shortly after hatching, allowing us to control their pretest experiences. Similar to humans, both 3-day-old [Experiment 1 (Exp. 1)] and 1-day-old (Exp. 2) chicks spontaneously choose a spiky shape when hearing the "kiki" sound and a round shape when hearing the "bouba" sound. Results from naïve young animals suggest a predisposed mechanism for matching the dimensions of shape and sound, which may be widespread across species.

https://www.science.org/doi/10.1126/science.adq7188

JAE GON KIM et al – Empathy and prosocial behavior powered by orexin-driven theta oscillations

Empathy measured through observational fear in rodents has been associated with increased theta oscillations in the anterior cingulate cortex (ACC). However, upstream circuit mechanisms modulating these oscillations and the extent of the oscillations' role in empathy-related behaviors remain elusive. We found that in mice, ACC theta oscillations are involved in empathy-driven prosocial allogrooming. Moreover, orexinergic neurons are selectively activated in the ACC during observational fear and prosocial allogrooming, but only when the animals had prior fear experience. Real-time, gaze-dependent optogenetic inhibition of lateral hypothalamic orexinergic inputs to ACC suppressed theta power and reduced both behaviors. These findings show that hypothalamic orexinergic inputs drive ACC theta oscillations to modulate observational fear and prosocial behaviors, providing circuit-level insight into how affective empathy translates into prosocial action.

https://www.science.org/doi/10.1126/science.aea7140

RICCARDO RAVASIO et al – Evolution of error correction through a need for speed

Kinetic proofreading is a class of error-correcting mechanisms in biology that expend energy to avoid mistakes during replication, transcription, and translation. Proofreading is typically assumed to evolve when selection for fidelity outweighs costs in energy and the speed of replication. We show that when stalling after misincorporations is accounted for, proofreading can instead speed up replication. Consistent with data on polymerase mutagenesis, our results suggest that proofreading can evolve under selection for speed alone. We generalize to multicomponent self-assembly and show that analogous error-correcting processes, such as dynamic instability, can likewise emerge purely from selection for rapid assembly. Thus, nonequilibrium error correction can evolve from selection for speed, even without direct fidelity advantages. We discuss implications for mutation-rate evolution, molecular assembly processes, and models of early life.
https://www.science.org/doi/10.1126/science.adt1275

COMMENTARIES

MARCUS PERLMAN & BODO WINTER – In search of meaning

The origins of language are not found in the bouba-kiki effect.

{Perhaps THE origins of language (whatever that means) are not found in the bouba-kiki effect, but it seems likely that SOME origins of language are in there. The capacity for sounds to represent shape and quality seems like the precursor to something communicative – maybe metaphor?}

https://www.science.org/doi/10.1126/science.aee8641

Science Advances

PAPERS

HUA TU et al with CHRISTOPHER BAE – The oldest in situ Homo erectus crania in eastern Asia: The Yunxian site dates to ~1.77 Ma

With the discovery of three almost complete Homo erectus crania, Yunxian is one of the most important early Pleistocene hominin sites in eastern Asia. Yet, the age of the Yunxian fossils has remained debated because of the lack of reliable numerical dating results. Here, we apply the well-established isochron 26Al/10Be burial dating to quartz gravels from two sediment layers of the site. The age results push the Yunxian crania back to 1.77 ± 0.08 million years ago (±1σ internal error), representing the oldest H. erectus fossils discovered in situ in eastern Asia. A much older age assignment to Yunxian supports the model of rapid dispersal and widespread distribution of early H. erectus and contributes to narrowing the chronological gap between the earliest archaeology and hominin paleontology in eastern Asia.
https://www.science.org/doi/10.1126/sciadv.ady2270

ALEXANDROS GELASTOPOULOS et al – The marginal majority effect: When social influence produces lock-in

People are influenced by the choices of others, a phenomenon observed across contexts in the social and behavioral sciences. Social influence can lock in an initial popularity advantage of an option over a higher quality alternative. Yet, several experiments designed to enable social influence have found that social systems self-correct rather than lock in. Here, we identify a behavioral phenomenon that makes inferior lock-in possible, which we call the "marginal majority effect": a discontinuous increase in the choice probability of an option as its popularity exceeds that of a competing option. We demonstrate the existence of a marginal majority effect in several recent experiments and show that lock-in always occurs when the effect is large enough to offset the quality effect on choice but rarely otherwise. Our results reconcile conflicting past empirical evidence and connect a behavioral phenomenon to the possibility of social lock-in.
https://www.science.org/doi/10.1126/sciadv.adr4237

Trends in Cognitive Sciences

ARTICLES

M.J. CROCKETT & LISA MESSERI – Producing more while understanding less with large language models

[See Messeri & Crockett, OTHER PUBLICATIONS, above.]

Many scientists are enthusiastic about the potentials of 'Artificial Intelligence' (AI) for research. We recently examined the vision of 'AI Surrogates' computer models [including but not limited to large language models (LLMs)] designed to simulate human participants for the purpose of generating knowledge about human cognition and behavior. Some scientists believe that AI Surrogates can improve the generalizability of cognitive science: first, by simulating diverse populations that are not readily accessible, overcoming the field's overreliance on Western, Educated, Industrialized, Rich, Democratic (WEIRD) samples; and second, by enabling researchers to quickly and cheaply explore vast experimental design spaces, expanding the diversity of situations that can be probed experimentally. We showed how this logic is flawed: AI Surrogates cannot faithfully represent diverse populations and are limited to simulating cognitive processes that are Decontextualized, Engineered, Anonymized, Disembodied (DEAD). Even the most moderate use case for AI Surrogates—pilot-testing potential research designs prior to validation in humans—suffers from these problems, because if scientists only collect human data for experiments that survive piloting with AI Surrogates, research will be limited to the study of DEAD cognition. AI Surrogates

risk entrenching illusions of generalizability, where scientists believe their findings are more generalizable than they actually are.

https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(26)00006-9

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