EAORC BULLETIN 1,156 – 10 August 2025

CONTENTS

NOTICES

FORMATTED VERSION OF THIS BULLETIN

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

PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.
If there is a journal you feel I should be tracking on a regular basis, let me know.
And if you have any other ideas for extending the "EAORC experience", please contact me.

EDITORIAL INTERJECTIONS

Comments in curly brackets are editorial interjections. The Editor reserves the right to be wrong, and doesn't object to being called out on it.

EAORC NEWS – Thank you for all the messages

Thank you to everyone who contacted me about the missing attachment last week, it let me correct my error quickly. I also got a lot of thanks for my efforts, which is always good to hear. I recently turned 72, which means I am now officially in the seventh age of humans:
Last scene of all,
That ends this strange eventful history,
Is second childishness and mere oblivion;
Sans teeth, sans eyes, sans taste, sans everything.
[In "All the world's a stage" speech spoken by Jaques. From "As You Like It" By William Shakespeare.]
I have finally given up dissertation supervision and marking to concentrate on the true tasks of old age: all the CYJs ("You're retired, can you just …) that have piled up. I still have most of my teeth – 29 at last count, plus one new member of the family; having been shortsighted for most of my life, the long-sightedness of old age has rendered reading glasses superfluous; I still enjoy good food, although less of it; and I seem to have retained enough of my faculties to write, garden and make badges to give away. In retirement you need three hobbies: the one you carried on from your work days; the one you always planned to do; and the weird one you never anticipated. Over the past three years I've given away about 10,000 badges – mostly LGBTQIA Pride badges, but also "слава Україні" and "Trump? Hell, No!" badges. Now that I'm old, I shall wear purple.
I have recently toyed with bringing the EAORC newsletter to a conclusion; but I keep looking at the next milestone and thinking, "just a few more…" The next big milestone is, of course, issue 1,234, then 1,306 (25 years) – and then we'll see.
Many thanks to following this adventure.

NEWS

NATURE BRIEFING – Bad apple editors identified at PLoS ONE

Nearly one-third of all retracted papers at PLoS ONE can be traced back to just 45 researchers who served as editors at the journal, five of whom Nature's news team have been able to identify. These editors handled only 1.3% of all articles published by the journal from 2006 to 2023, but the papers they accepted accounted for more than 30% of the 702 retractions thatPLoS ONEissued by early 2024. These retractions can't be blamed on a few bad authors, says metascientist and study co-author Reese Richardson. "There is complicity from within the journal-appointed editors that allows for this to happen."
https://www.nature.com/articles/d41586-025-02446-5

NATURE BRIEFING – How do you solve a problem like peer review?

Peer review — often described as the bedrock of scientific endeavour — is in crisis. The sheer number of manuscripts reaching publishers puts immense strain on editors, who say they're increasingly struggling to find reviewers. Some publishers are experimenting with innovations that streamline the process but retain its core tenets, such as providing referees with clear questions to address, or taking steps to make it easier to find reviewers, such as offering financial incentives. Others argue that an overhaul is in order, and the idea of scrapping the process for some articles is gaining traction.
https://www.nature.com/articles/d41586-025-02457-2

NATURE BRIEFING – Hominins and Sulawesi go way, way back

Stone tools found on Sulawesi in Indonesia suggest that ancient humans called hominins occupied the island around 1 million years ago — much earlier than we thought. The small tools were probably created using a percussion-flaking technique, in which a rock is struck with another stone to create sharp edges. Without fossils, researchers can't tell exactly which early human species made them, but Homo erectus is a potential candidate, says archaeologist and study co-author Adam Brumm.
https://www.livescience.com/archaeology/human-evolution/1-5-million-year-old-stone-tools-from-mystery-human-relative-discovered-in-indonesia-they-reached-the-region-before-our-species-even-existed

NEWS FROM SCIENCE – Scientific fraud has become an 'industry,' alarming analysis finds

Sophisticated global networks are infiltrating journals to publish fake papers.
https://www.science.org/content/article/scientific-fraud-has-become-industry-alarming-analysis-finds

NEWS FROM SCIENCE – One-fifth of computer science papers may include AI content

A surge in AI-generated text has been detected in papers across many disciplines since the release of ChatGPT.
https://www.science.org/content/article/one-fifth-computer-science-papers-may-include-ai-content

NEWS FROM SCIENCE – Ancient Europeans resisted inequality for 5000 years

Farming and draft animals didn't stratify societies in Carpathian Basin.
https://www.science.org/content/article/ancient-europeans-resisted-inequality-5000-years

NEWS FROM SCIENCE – Video reveals cockatoos have 30 unique dance moves—including headbanging

Researchers now know why the caged bird dances: a form of mentally enriching play.
https://www.science.org/content/article/video-reveals-cockatoos-have-30-unique-dance-moves-including-headbanging

SCIENCEADVISER – I'll be a drunken monkey's uncle

If you like to wind down from a stressful day with some friends and a cold one, you may be part of an evolutionary journey more than 10 million years in the making. For decades, researchers have wondered whether our ape ancestors developed a penchant for fermented fruits because it gave them some adaptive advantage—the so-called "drunken monkey" hypothesis. But proving that has been challenging, not least because scientists lacked the data to say whether apes consume enough fermented food to make the hypothesis plausible.

A study in BioScience last week gives that idea some support. Based on several years of field reports of gorillas, chimpanzees and orangutans in the wild, researchers determined that African apes—gorillas and chimps—ate fallen, presumably fermenting, fruit between 25% and 62% of the time (compared to fruit picked directly from plants), whereas orangutans, who are more distantly related to humans, rarely did so. Orangs also lack the genetic mutation—shared by humans, chimps and gorillas—necessary to efficiently metabolize alcohol.

That suggests our common ancestor with the African apes, too, shared this penchant for fermentation, and may have derived some benefit from being able to eat boozy fruit. One hypothesis? Rank, fermenting fruit is easy to sniff out, so being able to eat it would have given ancient apes an additional resource that other animals avoided.

Oh, and the scientists for the first time gave this behavior a name: "scrumping," borrowing a British term for gathering fallen apples or other fruit.
https://www.science.org/content/article/our-ape-ancestors-taste-fermenting-fruit-may-have-paved-boozy-evolutionary-path

SCIENCEADVISER – Unequal origins

We live in a society with haves and have-nots—but how did it get to be this way? How did social stratification take hold in the first place? One hypothesis, according to those who study the origins of inequality, is that the emergence of certain agricultural technologies—plows and draft animals, in particular—allowed smaller numbers of people to profit from large tracts of land, and to transmit the tools of that labor to future generations, leading to heritable wealth.

A paper out this week in Science Advances highlights a counterfactual: Societies in central Eastern Europe's Carpathian Basin between 6000 B.C.E. and 1000 B.C.E. adopted those agricultural technologies while maintaining a relatively high degree of egalitarianism. Researchers found that even as plowing took hold here, societal equality—as measured by well-accepted proxies like house size and grave foods—stayed remarkably stable.

Why did these communities resist inequality while neighboring ones didn't? One reason, experts note, may have been land availability. If your boss is working you too hard for too little pay, you can vote with your feet and find some new land to farm—a luxury which more "land-limited" societies simply didn't have.
https://www.science.org/doi/10.1126/sciadv.adu0323

SCIENCEADVISER – Girl power: Female gorillas outrank males twice their size

In concrete jungles all over the world it feels like men and women are constantly competing for dominance. As human women navigate gendered pay gaps and modern dating culture, their gorilla cousins in actual jungles have to deal with their own challenges, such as being half the size of their male counterparts. This physical difference has led people who study the creatures to believe that all males must outrank all females. Now, a new study calls into question this "male power archetype" by finding that female mountain gorillas actually outrank some males.

The researchers analyzed 25 years of behavioral data collected on 55 adult mountain gorillas in Uganda to understand the power dynamics between females and males. They found that even though each group was led by an alpha male, 88% of females outranked at least one male. These female gorillas even had feeding priority when it came time for the group to snack on their favorite rare delicacy, decaying wood.

Since the female gorillas did not use their attraction as a potential mate as leverage to gain power, perhaps they did so through alpha-male support or by threating to leave the group. However they did it, it's clear that non-alpha males are "aware of their social position and the social dynamics in a group … they know that they should restrain themselves to avoid aggression from the alpha male. If they want to remain in the group, it is better to acquiesce," senior author Martha Robbins told BBC Science Focus.

https://www.cell.com/current-biology/fulltext/S0960-9822(25)00872-3

SCIENCENEWS – Video: Plants build ant condos that keep warring species apart

Good fences make good neighbors, Robert Frost once quipped. It seems these ants would agree. Scientists cut up Squamellaria plants found perched in tropical forests in Fiji, revealing the multiple species of ant housed inside. When the walls fell, the ants went to war, as seen in video taken in the field.

As long as the plants remain intact, as many as five genetically distinct ant species can live in harmony, Susan Milius reports. That's because the plant grows inner walls that create separate chambers, each with its own private entrance, so the aggressive colonies never cross paths. As Milius writes, this "plant-based multiunit housing" offers a unique opportunity for scientists studying the evolution of cooperation and mutualism.

https://www.sciencenews.org/article/plant-warring-ants-apart-mutualism

SCIENCENEWS – 7 stone tools might rewrite the timeline of hominid migration in Indonesia

Excavated implements suggest a Homo species arrived on Sulawesi over 1 million years ago.

https://www.sciencenews.org/article/stone-tools-hominids-indonesia-hobbit

PUBLICATIONS

Animal Behaviour

PAPERS

SALLY E. STREET, INGA HAMILTON & SUSAN D. HEALY – Anthropocentric bias may explain research disparities between animal tool use and nest building

Scientists are not immune from bias. Studying nonhuman species objectively is inherently challenging, especially for 'charismatic' and ostensibly human-like behaviours. Animal tool use is a prime example: while often considered a hallmark of intelligence, the amount of research attention and public interest it generates seems disproportionate when compared with other behaviours involving similar manipulative skills, particularly nest building. Here, we reveal striking disparities in the treatment of tool use and nest building in the animal behaviour literature. We find that tool use publications are more highly cited, are more likely to be published in higher-impact journals and use more terminology suggestive of 'intelligence' and human-like cognition compared with nest building publications. Our findings are not confounded by taxonomic biases: these disparities persist even within studies of great apes and Corvus species. Further, we find that articles with more frequent use of 'intelligent' terminology are more highly cited, suggesting incentives for the use of anthropomorphic language in scientific articles. Finally, we find that tool use papers are more highly cited than nest building papers even when controlling for the use of 'intelligent' language, showing that both language use and behaviour have additive effects on research attention. We argue that these research disparities are partly driven by a widespread assumption that tool use requires more complex cognition than nest building. Since the cognitive mechanisms underpinning either behaviour are still not well understood, we suggest that the widespread appeal of animal tool use is partly due to anthropocentrism.

https://www.sciencedirect.com/science/article/pii/S0003347225001678

DAVIDE LIGA et al – Directional biases and individual differences in foraging strategies in Apis mellifera

Brain lateralization affects behaviour in both vertebrates and invertebrates, with population-level lateralization being advantageous in some contexts (e.g. mating) and individual-level lateralization beneficial in others. However, the specific contexts where this occurs in some species remain underexplored. In foraging, individual lateralization may aid in resource distribution, reducing overlap. This study investigates whether honey bees, Apis mellifera, show directional biases during a foraging task in an artificial meadow and how this affects their trajectories and foraging efficiency. Twenty bees from four

colonies foraged from 16 artificial flowers arranged in a 4 × 4 grid. We measured their overall directional biases in visiting (and revisiting) flowers and in the first flower choices over 16 trials. Moreover, we analysed foraging consistency and efficiency. An overall rightward population level was observed across trials. When analysing only the first flower choices, seven bees showed significant lateral biases (three favouring right and four left). Foraging efficiency, measured by time and trajectories, showed no clear pattern; only two lateralized individuals showed faster times and more consistent paths than nonlateralized bees. The results suggest that individual lateralization may not significantly impact foraging efficiency but could be advantageous for colony resource distribution. For all bees, whether lateralized or not, there was a strong correlation between trajectory similarity and foraging time: the more consistent the paths, the quicker the foraging. This study highlights lateralization in honey bees as a dynamic, context-dependent trait, potentially offering varying advantages depending on the task.
https://www.sciencedirect.com/science/article/abs/pii/S0003347225001642

MAYTE MARTÍNEZ & SARAH F. BROSNAN – Capuchin monkeys' responses to inequity in a group context
Noticing how ones' outcomes compare to your partner's can help you decide who to cooperate with, promoting cooperative relations that are beneficial for both. As such, understanding how animals respond to unequal outcomes is key to uncovering evolutionary roots of cooperation and fairness. Recent research has demonstrated that various animal species respond negatively when they receive less preferred rewards than a partner for completing the same task, often refusing the reward or withdrawing from the task. While most studies on inequity aversion focus on dyadic contexts, which ensure experimental control, these settings do not capture the complexity of natural social environments and may limit partner choice. In this study, we explored responses of brown capuchin monkeys, Sapajus [Cebus] apella, to inequity in a more naturalistic group context, extending their well-documented inequity aversion from dyadic contexts. We compared both food refusals and the number of trades in a token exchange task across various conditions (advantageous and disadvantageous inequity, contrast and equity) involving different combinations of food values. Considering refusals, as in dyadic studies, brown capuchin monkeys were sensitive to disadvantageous inequity, refusing low-value rewards when their partners received higher-value rewards, but rarely rejecting medium- or high-value food. Unexpectedly, we found a negative response to contrast and advantageous inequity, neither of which had been observed in previous studies. In contrast, the number of exchanges capuchins initiated was driven by food value, with no effect of what their partner received. We discuss various factors, such as group dynamics and constraints of the tasks that may explain differential responses in group versus dyadic contexts pointing to new research directions. This study highlights the importance of more naturalistic conditions to achieve a nuanced understanding of the impact of the social context on primate decision making.
https://www.sciencedirect.com/science/article/abs/pii/S0003347225001848

Current Biology

PAPERS

NIKOLAOS SMIT & MARTHA M. ROBBINS – Female mountain gorillas can outrank non-alpha males
Males have been long assumed to strictly outrank females in all but a few mammals, potentially due to male-biased size dimorphism emerging from male-male competition and female mate choice. However, recent work questions these traditional views, suggesting that intersexual power varies along a continuum from strictly male- to strictly female-biased and is not a static species attribute. We used a 25-year dataset to examine the intersexual power dynamics in wild mountain gorillas, considered a prominent example of strict male power. Although the highest-ranking individual in each of the four study groups was male, 88% of females outranked at least one adult male in multi-male groups. Females won 28% of agonistic interactions against non-alpha males, predominantly when these males were young adults or old. Our results did not support that females gain power over males due to mating-based leverage, as a byproduct of male-male competition, or due to female-female support, but they suggested that females may gain power over non-alpha males due to alpha male support and by leveraging commodities not directly linked to mating. Females always had feeding priority on a valued monopolizable resource over non-alpha males they outranked and, in half of the cases, over non-alpha males overall, highlighting a functional component of female empowerment. Our study questions the "male power archetype" assumption in a hominid that exhibits extreme male-biased sexual size dimorphism5,6 and, thus, it calls for future work to investigate similar long-standing assumptions regarding the evolutionary origins of intersexual relationships across species.
https://www.cell.com/current-biology/fulltext/S0960-9822(25)00872-3

Mind & Language

PAPERS

CHRISTIAN DE LEON – Conversational salience and mutual attention
The notion of conversational salience has proven useful for linguistic theorizing. Regardless of whether salience determines facts about meaning or merely aids in the communication of meanings, what is said is tied up with what is salient. I argue that the linguistic notion of salience is best understood in terms of the psychological notion of mutual attention. I discuss competing options and argue that only mutual attention suffices for establishing conversational salience in the way required

by linguistic theory. The picture that emerges is one on which conversational moves function in part to coordinate the attentional states of interlocutors.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.70001

Nature

ARTICLES

Stone tools suggest that hominins arrived on Indonesian island much earlier than thought
The discovery of stone tools dating to at least 1.04 million years ago at the Early Pleistocene site of Calio on the Indonesian island of Sulawesi indicates that early hominins made a major deep-sea crossing to reach the island much earlier than previously established.
https://www.nature.com/articles/d41586-025-02386-0

PAPERS

BUDIANTO HAKIM et mul – Hominins on Sulawesi during the Early Pleistocene
The dispersal of archaic hominins beyond mainland Southeast Asia (Sunda) represents the earliest evidence for humans crossing ocean barriers to reach isolated landmasses. Previously, the oldest indication of hominins in Wallacea, the oceanic island zone east of Sunda, comprised flaked stone artefacts deposited at least 1.02 ± 0.02 million years ago (Ma) at Wolo Sege on Flores. Early hominins were also established on the oceanic island of Luzon (Philippines), as indicated by both stone artefacts and cut marks on faunal remains dating to between 777 and 631 thousand years ago (ka) at Kalinga. Moreover, fossils of extinct, small-bodied hominins occur on Flores (Homo floresiensis) and Luzon (Homo luzonensis). On Sulawesi, the largest Wallacean island, previous excavations revealed stone artefacts with a minimum age of 194 ka at the open site of Talepu in the Walanae Depression, long preceding the earliest known presence of modern humans (Homo sapiens) in the region (73–63 ka in Sunda). Here we show that stone artefacts also occur at the nearby site of Calio in fossiliferous layers dated to at least 1.04 Ma and possibly up to 1.48 Ma, using palaeomagnetic dating of sedimentary rocks and coupled Uranium-series (U-series) and electron-spin resonance (US–ESR) dating of fossil teeth. The discovery of Early Pleistocene artefacts at Calio suggests that Sulawesi was populated by hominins at around the same time as Flores, if not earlier.
https://www.nature.com/articles/s41586-025-09348-6

Nature Cell Biology

PAPERS

CHUNYANG NI et mul – A programmed decline in ribosome levels governs human early neurodevelopment
Many neurodevelopmental defects are linked to genes involved in housekeeping functions, such as those encoding ribosome biogenesis factors. How reductions in ribosome biogenesis can result in tissue- and developmental-specific defects remains unclear. Here we describe variants in the ribosome biogenesis factor AIRIM/C1orf109 that are primarily associated with neurodevelopmental disorders. Using human cerebral organoids in combination with proteomic, single-cell RNA sequencing and single-organoid translation analyses, we identify a previously unappreciated drop in protein production during early brain development. We find that ribosome levels decrease during neuroepithelial differentiation, making differentiating cells particularly vulnerable to perturbations in ribosome biogenesis during this time. Reduced ribosome availability more profoundly impacts the translation of specific transcripts, disrupting both survival and cell fate commitment of transitioning neuroepithelia. Enhancing mTOR activity suppresses the growth and developmental defects associated with AIRIM/C1orf109 variants. This work provides evidence for the functional importance of regulated changes in global protein synthesis capacity during cellular differentiation.
https://www.nature.com/articles/s41556-025-01708-8

Nature Communications

PAPERS

ETIENNE COMBRISSON et al – Higher-order and distributed synergistic functional interactions encode information gain in goal-directed learning
Goal-directed learning arises from distributed neural circuits including the prefrontal, posterior parietal and temporal cortices. However, the role of cortico-cortical functional interactions remains unclear. To address this question, we integrated information dynamics analysis with magnetoencephalography to investigate the encoding of learning signals through neural interactions. Our findings revealed that information gain (the reduction in uncertainty about the causal relationship between actions and outcomes) is represented over the visual, parietal, lateral prefrontal and ventromedial/orbital prefrontal cortices. Cortico-cortical interactions encoded information gain synergistically at the level of pairwise and higher-order relations, such as triplets and quadruplets. Higher-order synergistic interactions were characterized by long-range relationships centered in the ventromedial and orbitofrontal cortices, which served as key receivers in the broadcast of information gain across cortical circuits. Overall, this study provides evidence that information gain is encoded through synergistic and higher-order functional interactions and is broadcast to prefrontal reward circuits.
https://www.nature.com/articles/s41467-025-62507-1

TJASA LAPANJA et al – Pupil size modulation drives retinal activity in mice and shapes human perception
Retinal adaptation is assisted by the pupil, with pupil contraction and dilation thought to prevent global light changes from triggering neuronal activity in the retina. However, we find that pupillary constriction from increased light, the pupillary light reflex (PLR), can drive strong responses in retinal ganglion cells (RGCs) in vivo in mice. The PLR drives neural activity in all RGC types, and pupil-driven activity is relayed to the visual cortex. Furthermore, the consensual PLR allows one eye to respond to luminance changes presented to the other eye, leading to a binocular response and modulation during low-amplitude luminance changes. To test if pupil-induced activity is consciously perceived, we performed psychophysics on human volunteers, finding a perceptual dimming consistent with PLR-induced responses in mice. Our findings thus uncover that pupillary dynamics can directly induce visual activity that is consciously detectable, suggesting an active role for the pupil in encoding perceived ambient luminance.
https://www.nature.com/articles/s41467-025-62736-4

Nature Communications Biology

PAPERS

ANDRÉANNE RENÉ et al – Prenatal linguistic exposure shapes language brain responses at birth
Newborns have an immature brain network responsible for speech processing that resembles the adult language network. However, it remains unclear how prenatal experience modulates this network. To test this, we exposed 39 fetuses to a story in their native language and in a foreign language during the last month of gestation, while another group of 21 fetuses received no experimental prenatal exposure. Within 3 days of life, neonates' brain responses were recorded using functional near-infrared spectroscopy (fNIRS) whilst they listened to the same story in their native language and in two foreign languages, one of which neonates had been prenatally exposed to. Results revealed that brain responses to the native language and the prenatally exposed foreign language were similar, whereas they differed in the left temporal and right prefrontal regions when listening to a prenatally unexposed foreign language. Findings indicate that foetuses' linguistic environment influences speech processing at birth.
https://www.nature.com/articles/s42003-025-08594-8

Nature Ecology & Evolution

ARTICLES

Isotope analysis of fossil teeth provides insight into the habitat and life histories of the early hominin Paranthropus robustus
Geochemical chronologies in surface increments and exposed cross-sections of naturally fractured hominin enamel from the South African sites of Swartkrans and Kromdraai indicate that Paranthropus robustus exploited both forest and grassland habitats, and that individuals did not move on the landscape in a manner analogous to extant African apes.
https://www.nature.com/articles/s41559-025-02799-0

MICHAEL A. PARDO et al – Author Correction: African elephants address one another with individually specific name-like calls
We discovered that one of the data points for the playback experiment was copied incorrectly into the final datasheet from the Raven selection table where they were scored. Subsequent re-scoring of the video and audio recordings of all the playback trials revealed four additional errors, but none of the results changed qualitatively (statistical significance remains the same). However, the specific values of the model coefficients for latency to vocalize and number of vocalizations post-playback have changed slightly, which has affected Fig. 4 and its caption and Table 2.
Figure 4 has now been corrected in the HTML and PDF versions of the article.
https://www.nature.com/articles/s41559-025-02823-3
ORIGINAL ARTICLE [EAORC Bulletin 1,096]: MICHAEL A. PARDO et al – African elephants address one another with individually specific name-like calls
https://www.nature.com/articles/s41559-024-02420-w

Nature Human Behaviour

PAPERS

YIXUAN LISA SHEN et al – Neural similarity predicts whether strangers become friends
What determines who becomes and stays friends? Many factors are linked to friendship, including physical proximity and interpersonal similarities. Recent work has leveraged neuroimaging to detect similarities among friends by capturing how people process the world around them. However, given the cross-sectional nature of past research, it is unknown if neural similarity precedes friendship or only emerges among friends following social connection. Here we show that similarities in neural responses to movie clips—acquired before participants met one another—predicted proximity in a friendship network eight months later (that is, participants with similar responses were more likely to be friends rather than several degrees of separation apart). We also examined changes in distances between participants in their shared social network, which

resulted from the formation, persistence and dissolution of friendships, between two months and eight months after they met each other. Compared with people who drifted further apart, people who grew closer over this six-month period had been more neurally similar as strangers. In addition, analyses controlling for sociodemographic similarities showed that whereas these similarities appeared to drive the differences in pre-existing neural similarities between friends and dyads of a social distance of 3, they did not account for the more extensive links between pre-existing neural similarities and the tendency for people to grow closer together, rather than drift farther apart, over time. Thus, whereas some friendships may initially form due to circumstance and dissolve over time, later-emerging and longer-lasting friendships may be rooted in deeper interpersonal compatibilities that are indexed by pre-existing neural similarities. The localization of these results suggests that pre-existing similarities in how people interpret, attend to and emotionally respond to their surroundings are precursors of future friendship and increased social closeness.
https://www.nature.com/articles/s41562-025-02266-7

Nature Humanities & Social Sciences Communications

PAPERS

ZHUOLUN LI, YAQIAN SHI & LEI LEI – Metaphor as a springboard to scientific communication: a large-scale study of the use of lexical metaphors across disciplines

Metaphors are important devices in academic discourse. Although several studies have examined the use of metaphors in academic discourse, their findings remain inconclusive due to the manual detection of metaphors and hence the very limited size of data used in their research. To address the issue, we proposed a method to analyse the use of lexical metaphors in a large-scale dataset of academic texts. To be specific, we used a pre-trained large language model to automatically identify and examine the use of lexical metaphors in more than forty-thousand abstracts across five disciplines. The findings showed that lexical metaphors were frequently used across disciplines. In addition, lexical metaphors were used more frequently in soft sciences than in hard sciences. Among the three types of metaphors, indirect metaphors were used most frequently. The results were explained from perspectives such as different roles that texts of different disciplines played for the dissemination of knowledge and the communication of scientific arguments and the functions of different metaphor types. Our study is the first large-scale attempt to extensively analyse the use of lexical metaphors with an automatic metaphor identification tool in academic discourse. Implications for academic writing instruction and future research are also discussed.
https://www.nature.com/articles/s41599-025-05677-z

Nature Journal of Human Genetics

PAPERS

ALBERT MIN-SHAN KO, HUNG-PIN TU & YING-CHIN KO – Genetic insights into the origin, admixture, and migration of the early Austronesian peoples

It is understood that Austronesian ancestors appeared in Taiwan ~6 thousand years ago (Kya), and later expanded beyond Taiwan, but their early origins and relationships with people outside Taiwan remain uncertain. By reconstructing phylogenetic patterns and phylogeographical distribution from mitochondrial and Y haplogroups and genome-wide data, new evidence shows that the Pre-Austronesians may have originated in the coastal southeastern China (centered on Fujian) during the very early Neolithic Age (>10Kya) and lived on the marine subsistence in addition to hunting-gathering. They subsequently mixed with some ancient northern Chinese (from Shandong) and introduced mixed millets and rice cultivation, forming the Proto-Austronesian people ~7-10Kya. Later, Early Austronesians (~4-7Kya) evolved and migrated to Taiwan (~6Kya), and then spread to Island Southeast Asia (ISEA), Champa, southern Thailand, Madagascar, and Oceania via the Philippines (~4.1Kya). The second source is the Austroasiatic ancestors, who originated in southern China in the early Neolithic Age and migrated to the ISEA via the Mainland Southeast Asia and Malay Peninsula in the late Neolithic Age. They mixed with the core Austronesian speakers from Taiwan to become Austronesian speakers, and spread to Oceania. Linguistic and archaeological findings also support the Austronesian origins and genetic prehistory. Most recently, some Austronesians of ISEA have mixed with newcomers from South Asia. The Austronesian ancestors neither originated in the ISEA nor migrated directly from mainland China to the Philippines, also has nothing to do with the so-called “two-layer” hypothesis. Future research requires more Paleolithic and Neolithic genetic evidence, improved genetic age estimates, and multidisciplinary consistency.
https://www.nature.com/articles/s10038-025-01380-8

Nature Machine Intelligence

PAPERS

ADRIEN DOERIG et al – High-level visual representations in the human brain are aligned with large language models

The human brain extracts complex information from visual inputs, including objects, their spatial and semantic interrelations, and their interactions with the environment. However, a quantitative approach for studying this information remains elusive. Here we test whether the contextual information encoded in large language models (LLMs) is beneficial for modelling the complex visual information extracted by the brain from natural scenes. We show that LLM embeddings of scene captions

successfully characterize brain activity evoked by viewing the natural scenes. This mapping captures selectivities of different brain areas and is sufficiently robust that accurate scene captions can be reconstructed from brain activity. Using carefully controlled model comparisons, we then proceed to show that the accuracy with which LLM representations match brain representations derives from the ability of LLMs to integrate complex information contained in scene captions beyond that conveyed by individual words. Finally, we train deep neural network models to transform image inputs into LLM representations. Remarkably, these networks learn representations that are better aligned with brain representations than a large number of state-of-the-art alternative models, despite being trained on orders-of-magnitude less data. Overall, our results suggest that LLM embeddings of scene captions provide a representational format that accounts for complex information extracted by the brain from visual inputs.
https://www.nature.com/articles/s42256-025-01072-0

Nature Methods

ARTICLES

NINA VOGT – Neuropixels for nonhuman primates
Neuropixels probes have revolutionized extracellular recordings in rodents because of the high quality of the recordings and the large number of neurons that can be monitored. However, their small size makes them less ideal for organisms with larger brains such as macaques or even humans.
https://www.nature.com/articles/s41592-025-02791-3

Nature Neuropsychopharmacology

PAPERS

CATHERINE JENSEN PEÑA – Epigenetic regulation of brain development, plasticity, and response to early-life stress
Brain development is choreographed by complex gene programs, regulated in turn by epigenetic mechanisms. Far from being complete at birth, both the brain and epigenome continue to mature postnatally. Recent research has found postnatal maturation of the epigenome—including cell-type specific patterns of DNA methylation, chromatin modifications, and non-coding RNAs—to be largely complete by the peri-adolescent period. However, a feature of neurons is their plasticity and dynamic responsiveness to environmental and other signals, and epigenetic mechanisms help govern both critical period and life-long plasticity. Environmental perturbations during development, such as early-life stress, can also become encoded in the epigenome. Evidence from human and non-human animal studies of early-life stress has converged on long-lasting epigenetic changes at several key genes which confer functional changes in stress response, as well as epigenome-wide changes including accelerated epigenetic aging. This review describes epigenetic processes and synthesizes recent literature on postnatal epigenome maturation, the relationship between the epigenome and postnatal sensitive periods and plasticity, and the impact of early-life stress on epigenetic development.
https://www.nature.com/articles/s41386-025-02179-z

Nature Scientific Reports

PAPERS

PALMIRA SALADIÉ et al – Evidence of neolithic cannibalism among farming communities at El Mirador cave, Sierra de Atapuerca, Spain
In El Mirador cave in Sierra de Atapuerca, Spain, a unique collection of human remains provides insights into cannibalistic practices from the Neolithic to the Bronze Age. Six Early Bronze Age individuals (4600–4100 cal BP) showing signs of cannibalism were discovered in the early 2000s. Later excavations uncovered older remains with similar cultural modifications. A Bayesian statistical analysis of the radiocarbon dates identified a single earlier event (5709–5573 cal BP) unrelated to the Bronze Age finds. 87Sr/86Sr analysis showed the cannibalised people were of local origin. The episode coincided with the end of the Neolithic occupation, suggesting this was a not common behaviour among the cave inhabitants. Given the age of the cannibalised individuals and environmental conditions, the data does not indicate a response to famine. This study complements and expands upon our understanding of European prehistoric cannibalism. The current findings suggest that cannibalism may be linked to intergroup violence during late prehistoric periods.
https://www.nature.com/articles/s41598-025-10266-w

ALICE LUO, JINTIAN LUO & MICHAEL MURPHY – Binomial order is a speech marker of psychosis and thought disorder
Thought disorder, characterized by disruptions in syntactic and semantic elements in language, is a core symptom of psychotic disorders. Understanding this language impairment is key to uncovering the underlying neuropathology and predicting treatment outcomes for individuals with schizophrenia and other psychotic disorders. Binomial ordering preferences (e.g. “salt and pepper” instead of “pepper and salt”), may be a quantifiable correlate of thought disorder and underlying linguistic impairments. We tested whether atypical binomial ordering can serve as a linguistic marker for psychosis symptoms. Participants with early-stage psychotic disorders and controls were recruited, and video-recorded interviews were transcribed for analysis. Identified binomial pairs were assessed using both the Google N-gram database and a logistic regression model to determine ordering preferences. Results showed that while both psychotic participants and

controls preferred conventional binomial orderings, participants with psychotic disorders exhibited a higher rate of atypical binomial orderings. The use of atypical orderings was correlated with thought disorder, but not with other psychiatric symptoms or medications. Tracking binomial ordering can be a valuable marker of thought disorder but future studies are needed to determine whether this link remains stable or if it changes with disease progression.
https://www.nature.com/articles/s41598-025-14681-x

JIANHUI SHI, LINTING WANG & LEI M. LI – Saltations of cis-regulatory modules in Canidae and Hominidae
Dogs, which were segregated from wolves about thirty thousand years ago, show unique human-similar social-cognitive abilities. However, the genomic basis accounting for the phenotypic saltation between dog and wolf remains unclear. We performed a comparative analysis of genome-wide cis-regulatory element frequencies (CREF) for five canids: dog, dingo, red fox, dhole, and wolf, along with four hominids. For each species, genome-wide CREFs are organized into a matrix. The species-specific CREF matrix is stratified into multiple dual eigen-modules through robust singular value decomposition. Cross-species comparisons of dual eigen-modules demonstrated that the top three eigen-modules are highly conserved while the fourth and fifth ones underwent a saltation in dogs. The red fox is closest to the degenerate point characterizing the onset of saltation. Gene enrichment analysis and motif analysis revealed that myelination, long-term memory, and cochlear development are significantly enhanced at level four in both humans and dogs, but not in wolves. Cross-family comparisons revealed a more similar cognition-memory module between humans and dogs than between humans and chimpanzees. Not only the presence of cis-elements but also their frequencies are crucial for deciphering the regulatory saltations that characterize a striking convergent evolution of dogs and humans in proximal regulatory sequences.
https://www.nature.com/articles/s41598-025-13034-y

SAID-IRAJ HASHEMI et al with DIDIER DEMOLIN – EEG oscillations and related brain generators of phonation phases in long utterances
While the role of brain rhythms in respiratory and speech motor control has been mainly explored during brief utterances, the specific involvement of brain rhythms in the transition of regulating subglottic pressure phases which are concomitant to specific muscle activation during prolonged phonation remains unexplored. This study investigates whether power spectral variations of the electroencephalogram brain rhythms are related specifically to prolonged phonation phases. High-density EEG and surface EMG were recorded in nineteen healthy participants while they repeatedly produced the syllable [pa] without taking a new breath, until reaching respiratory exhaustion. Aerodynamic, acoustic, and electrophysiological signals were analyzed to detect the brain areas involved in different phases of prolonged phonation. Each phase was defined by successive thoracic and abdominal muscle activity maintaining estimated subglottic pressure. The results showed significant changes in power spectrum, with desynchronization and synchronization in delta, theta, low-alpha, and high-alpha bands during transitions among the phases. Brain source analysis estimated that the first phase (P1), associated with vocal initiation and elastic rib cage recoil, involved frontal regions, suggesting a key role in voluntary phonation preparation. Subsequent phases (P2, P3, P4) showed multiband dynamics, engaging motor and premotor cortices, anterior cingulate, sensorimotor regions, thalamus, and cerebellum, indicating progressive adaptation and fine-tuning of respiratory and articulatory muscle control. Additionally, the involvement of temporal and insular regions in delta rhythm suggests a role in maintaining phonetic representation and preventing spontaneous verbal transformations. These findings provide new insights into the mechanisms and brain regions involved in prolonged phonation. These findings pave the way for applications in vocal brain-machine interfaces, clinical biofeedback for respiratory and vocal disorders, and the development of more ecologically valid paradigms in speech neuroscience.
https://www.nature.com/articles/s41598-025-13901-8

Neuron

ARTICLES

TOMOYA NAKAMURA & HAKWAN LAU – Perceptual metacognition beyond confidence
In this issue of Neuron, Dijkstra et al. showed that deciding whether a perceived stimulus is actually present or whether it is just one's own imagination depends on specific signals in the fusiform gyrus that are monitored by higher brain regions.
https://www.cell.com/neuron/abstract/S0896-6273(25)00518-5

KENT IMAIZUMI & SERGIU P. PAŞCA – Timing matters: Genetic regulation of neuronal maturation in the primate brain
The molecular mechanisms that govern the extended neuronal maturation in the primate brain remain incompletely understood. In this issue of Neuron, Gao et al. measure gene activity, chromatin state, and electrical properties of individual neurons in the macaque to reveal some of the genetic regulators of neuronal maturation in the cerebral cortex.
https://www.cell.com/neuron/abstract/S0896-6273(25)00520-3

PAPERS

YU GAO et al – Multimodal analyses reveal genes driving electrophysiological maturation of neurons in the primate prefrontal cortex

The prefrontal cortex (PFC) is critical for myriad high-cognitive functions and is associated with several neuropsychiatric disorders. Here, using Patch-seq and single-nucleus multiomic analyses, we identified genes and regulatory networks governing the maturation of distinct neuronal populations in the PFC of rhesus macaque. We discovered that specific electrophysiological properties exhibited distinct maturational kinetics and identified key genes underlying these properties. We unveiled that RAPGEF4 is important for the maturation of resting membrane potential and inward sodium current in both macaque and human. We demonstrated that knockdown of CHD8, a high-confidence autism risk gene, in human and macaque organotypic slices led to impaired maturation, via downregulation of key genes, including RAPGEF4. Restoring the expression of RAPGEF4 rescued the proper electrophysiological maturation of CHD8-deficient neurons. Our study revealed regulators of neuronal maturation during a critical period of PFC development in primates and implicated such regulators in molecular processes underlying autism.
https://www.cell.com/neuron/fulltext/S0896-6273(25)00308-3

NADINE DIJKSTRA et al – A neural basis for distinguishing imagination from reality

Humans are able to imagine scenarios that are decoupled from the current environment by internally activating perceptual representations. Although an efficient re-use of existing resources, it remains unknown how human observers classify perceptual signals as reflecting external reality, as opposed to internal simulation or imagination. Here, we show that judgments of reality are underpinned by the combined strength of sensory activity generated by either imagery or perception in the fusiform gyrus. Activity fluctuations in this region predict confusions between imagery and perception on a trial-by-trial basis and interact with a frontal brain network encoding binary judgments of reality. Our results demonstrate that a key mechanism through which the brain distinguishes imagination from reality is by monitoring the activity of the mid-level visual cortex. These findings increase our understanding of failures of reality testing and lay the foundations for characterizing a generalized perceptual reality monitoring system in the human brain.
https://www.cell.com/neuron/fulltext/S0896-6273(25)00362-9

New Scientist

REVIEWS

RICHARD SMYTH – Biodiversity needs neurodiversity, says insightful new book

Review of 'Neurodivergent, By Nature: Why Biodiversity Needs Neurodiversity', Bloomsbury, 2025
https://www.newscientist.com/article/mg26735551-700-biodiversity-needs-neurodiversity-says-insightful-new-book/

PLoS Biology

PAPERS

JOSEPH G. MINE et al with RICHARD W. WRANGHAM, KATIE E. SLOCOMBE & SIMON W. TOWNSEND – Chimpanzee mothers, but not fathers, influence offspring vocal–visual communicative behavior

Face-to-face communication in humans typically consists of a combination of vocal utterances and body language. Similarly, our closest living relatives, chimpanzees, produce multiple vocal signals alongside a wide array of manual gestures, body postures and facial expressions. In humans, the ontogenetic development of communicative behavior is known to be heavily influenced by the child's primary caretakers. In chimpanzees, the extent to which communicative behavior is learned, as opposed to genetically inherited, remains openly debated. Here, we address this issue within the context of multi-modal communication by investigating kinship patterns in the production of visual behaviors alongside vocal signals in wild chimpanzees from the Kanyawara community, Uganda. We report a similarity in the number of visual behaviors combined with vocal signals between individuals who are related via their mother, while no similarity is observed between paternal relatives, in line with the observation that chimpanzee mothers constitute the primary caretakers, while fathers are not involved in parenting. We conclude that the development of this aspect of multi-modal communicative behavior is unlikely to be genetically driven and is rather a result of learning via exposure to social templates, akin to processes involved in the acquisition of human communication.
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3003270

COMMENTARIES

GORDANA DODIG-CRNKOVIC – Thinkers Without Thoughts: An Info-Computational Proposal. Comment on "Thoughts and Thinkers: The Conceptual Structure of Thinking" by Chris Fields & Michael Levin

https://www.sciencedirect.com/science/article/abs/pii/S1571064525001216

ORIGINAL PAPER: EAORC Bulletin 1,127]

CHRIS FIELDS & MICHAEL LEVIN – Thoughts and thinkers: On the complementarity between objects and processes

https://www.sciencedirect.com/science/article/abs/pii/S1571064525000089

PLoS One

PAPERS

HITOSHI YAMAMOTO, ISAMU OKADA & TAKAHISA SUZUKI – Gradual reputation dynamics evolve and sustain cooperation in indirect reciprocity

Humans have achieved widespread cooperation, largely sustained by mechanisms such as indirect reciprocity, which relies on reputation and social norms. People are highly motivated to maintain a good reputation, and social norms play a critical role in reputation systems by defining acceptable behavior, helping prevent exploitation by free-riders. However, there is a gap between theory and experiment in handling reputation information, with experiments often failing to capture the complexity that theoretical models propose. Here, we address two key issues: what kind of information is needed to define reputation as a social norm and the appropriate level of granularity required for reputation information to function effectively. This paper combines scenario-based experiments and evolutionary game theory to investigate the social norms individuals adopt in real-world settings, aiming to uncover the stability of these norms. Our results show that reputations should be categorized into three levels good, neutral, and bad. Results suggest gradual reputation dynamics that increase and decrease gradually due to cooperation or defection. However, a person's reputation remains unchanged only when they defect against a bad reputation. Our experimental and theoretical results support critical insights into the dynamics of reputation and social norms within indirect reciprocity, challenging traditional binary reputational evaluations. The gradual nature of reputation updating and the use of nuanced evaluations provide a more realistic model of reputation dynamics.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0329742

Science Advances

PAPERS

PAUL R. DUFFY et al – Five thousand years of inequality in the Carpathian Basin

The emergence of sedentary farming economies, especially in contexts intensified by plow agriculture, has been argued to underpin marked increases in economic inequality and its intergenerational transmission across Eurasia. To assess this presumed causal relationship, we examine relational (burials) and material (house sizes) inequalities in the Carpathian Basin, a large region in central Europe, from the time the first farmers arrived in southeastern Europe through the next five millennia to the Bronze Age. We find that although farming did increase the potentials for both relational and material inequalities, the potential was rarely reached and then only for short durations. We identify a series of leveling mechanisms varying over time, including the removal of material wealth from circulation through the placement in graves, community fission, and investments of surplus labor in infrastructural investments. In the Carpathian Basin, only after at least 5000 years were the intergenerational potentials of material wealth transmissions more broadly realized.
https://www.science.org/doi/10.1126/sciadv.adu0323

Trends in Cognitive Sciences

ARTICLES

JUDITH HOLLER – Facial clues to conversational intentions

It has long been known that we use words to perform speech acts foundational to everyday conversation, such as requesting, informing, proposing, or complaining. However, the natural environment of human language is face-to-face interaction where we use words and an abundance of visual signals to communicate. The multimodal nature of human language is increasingly recognised in the language and cognitive sciences. In line with this turn of the tide, findings demonstrate that facial signals significantly contribute to communicating intentions and that they may facilitate pragmatically appropriate responding in the fast-paced environment of conversation. In light of this, the notion of speech acts no longer seems appropriate, highlighting the need for a modality-neutral conception, such as social action.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00079-8

YNGWIE A. NIELSEN & MORTEN H. CHRISTIANSEN – Context, not grammar, is key to structural priming

Structural priming – a change in processing after repeated exposure to a syntactic structure – has been put forward as evidence for the psychological reality of constituent structures derived from grammar. However, converging evidence from memory research, large language models (LLMs), and structural priming itself challenges the validity of mapping structural representations onto grammatical constituents and demonstrates structural priming in the absence of such structure. Instead of autonomous representations specified by grammar, we propose that contextual representations emerging from multiple constraints (e.g., words, prosody, gesture) underlie structural priming. This perspective accounts for existing anomalous findings, is supported by the strong dependence on lexical cues observed in structural priming, and suggests that future research should prioritize studying linguistic representations in more naturalistic contexts.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(25)00143-3

MICHAEL TOMASELLO – How to make artificial agents more like natural agents

The quest to make artificial intelligence models more human-like could profit from a study of biological agents and their evolution. Recent research suggests that animal species on the evolutionary line to humans employed a series of qualitatively

distinct agentive architectures of ever-increasing complexity, with humans then forming shared agencies coordinated via linguistic communication.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00184-6

ERNEST MAS-HERRERO, ROBERT J. ZATORRE & JOSEP MARCO-PALLARÉS – Understanding individual differences to specific rewards through music

Understanding reward processing is essential for comprehending human behavior, from motivation and learning to affective disorders and addiction. Most research assumes a global sensitivity to reward, overlooking specific sensitivities to different stimuli. However, recent studies have revealed variability in music reward sensitivity, including healthy individuals with specific musical anhedonia – an impaired ability to derive pleasure from music despite intact responses to other rewards. This review explores individual differences in music reward and potential causes of musical anhedonia. We propose a brain model suggesting that reward experiences depend on both the overall functioning of the reward system and specific perceptual–reward network interactions. Finally, we discuss how this model and methodologies from music research can be applied to other rewarding stimuli.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00178-0

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