

EAORC BULLETIN 1,066 – 19 November 2023

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NOTICES

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.

NEWS

NATURE BRIEFING – Daily briefing: Rats use imagination to create mental maps

Rats can ‘reminisce’ about places they’ve been before. Plus, how a robot chemist could make oxygen on Mars and a gene-editing method reduces cholesterol in the first human trial — but raises safety concerns.

<https://www.nature.com/articles/d41586-023-03556-8>

SCIENCEADVISER – Scientists are publishing too many papers—and that’s bad for science

Academia is often described as a “publish or perish” environment. So much of a scientist’s career is measured in research papers—generally the more, the merrier. And that’s harming the scientific enterprise as a whole [<https://arxiv.org/abs/2309.15884>], not to mention researchers’ mental and physical health, according to the authors of a recent arXiv preprint.

In recent years, the number of papers being published has “grown exponentially,” the team explains. In 2016, about 1.92 million papers were indexed by the Scopus and Web of Science publication databases. In 2022, that number had jumped to 2.82 million. And this leap happened even as the number of newly awarded PhDs leveled off and declined. That means that, on average, each scientist is writing, editing, and reviewing more papers, they say—a problem they dub “the strain on scientific publishing.”

According to the team’s data, a handful of publishers—MDPI, Elsevier, Frontiers, Springer-Nature, and Wiley—account for more than 70% of the increase in articles per year. In fact, MDPI alone is responsible for 27% of the increase. There’s a single reason for that, according to a Bluesky post from first author Mark Hanson: “I could be nuanced (it’s in the paper!). But let’s be frank: it’s special issues.”

Special issues, where researchers are encouraged to contribute papers related to a topic, used to be few and far between. Now, they’re the primary way research is published in MDPI and Frontiers journals, Hanson and colleagues write. And special issues have lower rejection rates and faster turnaround times—potential indicators that the papers are lower quality, the team says. “We’re all overworked, and we can’t let this go on. Our metrics tell us this growth isn’t rigorous science,” Hanson writes in another post.

Why the push for so many papers? Hanson and colleagues didn’t have access to revenue data for the publishers they examined, but they suspect it’s profit-driven. A back-of-the-envelope calculation from co-author Dan Brockington estimates that MDPI made roughly twenty times as much from author processing charges in 2021 than in 2015

[<https://danbrockington.com/2022/11/10/mdpi-journals-2015-2021/>]. And a recent analysis in Quantitative Science Studies found that article processing charges for making papers open access drove massive income gains

[https://direct.mit.edu/qss/article/doi/10.1162/qss_a_00272/118070/The-Oligopoly-s-Shift-to-Open-Access-How-the-Big] for for-profit publishers (Science is published by the non-profit AAAS) in recent years. The authors of that paper estimated that scientists paid more than \$1 billion in open-access article fees to five of the biggest publishers—Elsevier, Sage, Springer-Nature, Taylor & Francis, and Wiley—between 2015 and 2018. And they note that these companies have “an obscenely high profit margin,” pointing to previous calculations [<https://svpow.com/2012/01/13/the-obscene-profits-of-commercial-scholarly-publishers/>].

Unsurprisingly, MDPI and other publishers disagree with Hanson et al.’s analyses. A representative from MDPI told El Pais [<https://english.elpais.com/science-tech/2023-10-31/public-funds-being-swallowed-up-by-scientific-journals-with-dubious-articles.html>] that the data is “questionable and imprecise” and stood by the increase in special issues, as it “reflects our dedication to advancing scholarly publishing and meeting the changing needs of the research community.” A spokesperson for Frontiers similarly defended special issues, saying the analyses have “notable limitations and possible biases” and that Frontiers journals “ensure meticulous scrutiny of scholarly work before publication.”

Regardless of the motivations behind special issues or the increase in paper production, the strain on scientists is real, Hanson and colleagues say, and reducing it will require fundamental changes to academic culture and scientific publishing. “If this continues, we may lose the most important thing about science, which is scientific rigor,” Gómez Barreiro, another of the paper’s co-authors, tells El Pais. “If you lose that, you lose everything.”

THE CONVERSATION – Why the future might not be where you think it is

We use space to understand the passage of time, but don’t assume everyone thinks of the future as in front and the past as behind.

[<https://theconversation.com/why-the-future-might-not-be-where-you-think-it-is-216861>]

THE CONVERSATION – Orkney’s lost tomb – how my team and I made the Neolithic discovery

It is unusual to find a tomb so intact and so well preserved.

[<https://theconversation.com/orkneys-lost-tomb-how-my-team-and-i-made-the-neolithic-discovery-216769>]

THE CONVERSATION – Creative minds are vulnerable to mental illness – but magicians escape the curse

Research suggests magicians lack magical thinking.

[<https://theconversation.com/creative-minds-are-vulnerable-to-mental-illness-but-magicians-escape-the-curse-216319>]

PUBLICATIONS

ArXiv

PAPERS

MARK A. HANSON et al – The strain on scientific publishing

Scientists are increasingly overwhelmed by the volume of articles being published. Total articles indexed in Scopus and Web of Science have grown exponentially in recent years; in 2022 the article total was 47% higher than in 2016, which has outpaced the limited growth, if any, in the number of practising scientists. Thus, publication workload per scientist (writing, reviewing, editing) has increased dramatically. We define this problem as the strain on scientific publishing. To analyse this strain, we present five data-driven metrics showing publisher growth, processing times, and citation behaviours. We draw these data from web scrapes, requests for data from publishers, and material that is freely available through publisher websites. Our findings are based on millions of papers produced by leading academic publishers. We find specific groups have disproportionately grown in their articles published per year, contributing to this strain. Some publishers enabled this growth by adopting a strategy of hosting special issues, which publish articles with reduced turnaround times. Given pressures on researchers to publish or perish to be competitive for funding applications, this strain was likely amplified by these offers to publish more articles. We also observed widespread year-over-year inflation of journal impact factors coinciding with this strain, which risks confusing quality signals. Such exponential growth cannot be sustained. The metrics we define here should enable this evolving conversation to reach actionable solutions to address the strain on scientific publishing.

<https://arxiv.org/abs/2309.15884>

Cell Reports

PAPERS

JAKOB SEIDLITZ et al with LIFESPAN BRAIN CHART CONSORTIUM – The molecular genetic landscape of human brain size variation

Human brain size changes dynamically through early development, peaks in adolescence, and varies up to 2-fold among adults. However, the molecular genetic underpinnings of interindividual variation in brain size remain unknown. Here, we leveraged postmortem brain RNA sequencing and measurements of brain weight (BW) in 2,531 individuals across three independent datasets to identify 928 genome-wide significant associations with BW. Genes associated with higher or lower BW showed distinct neurodevelopmental trajectories and spatial patterns that mapped onto functional and cellular axes of brain organization. Expression of BW genes was predictive of interspecies differences in brain size, and bioinformatic annotation revealed enrichment for neurogenesis and cell-cell communication. Genome-wide, transcriptome-wide, and phenome-wide association analyses linked BW gene sets to neuroimaging measurements of brain size and brain-related clinical traits. Cumulatively, these results represent a major step toward delineating the molecular pathways underlying human brain size variation in health and disease.

[https://www.cell.com/cell-reports/fulltext/S2211-1247\(23\)01451-1](https://www.cell.com/cell-reports/fulltext/S2211-1247(23)01451-1)

eLife

ARTICLES

HÉLOÏSE DE VAREILLES – Cerebellum: Folding into shape

During development, the brains of most mammals (including humans) will fold into a unique pattern of grooves and ridges. Understanding how these wrinkles emerge can provide important insights into how the brain works. Most research in this area has focused on the structure of the cerebrum, the two large lobes that make up most of the brain. However, much less is known about the structure of the cerebellum – the ‘little brain’ that sits beneath the cerebrum.

<https://elifesciences.org/articles/93122>

PAPERS

ETIENNE COMBRISSEON et al – Neural interactions in the human frontal cortex dissociate reward and punishment learning

How human prefrontal and insular regions interact while maximizing rewards and minimizing punishments is unknown. Capitalizing on human intracranial recordings, we demonstrate that the functional specificity toward reward or punishment learning is better disentangled by interactions compared to local representations. Prefrontal and insular cortices display non-selective neural populations to reward and punishment. The non-selective responses, however, give rise to context-specific interareal interactions. We identify a reward subsystem with redundant interactions between the orbitofrontal and ventromedial prefrontal cortices, with a driving role of the latter. In addition, we find a punishment subsystem with redundant interactions between the insular and dorsolateral cortices, with a driving role of the insula. Finally, switching between reward and punishment learning is mediated by synergistic interactions between the two subsystems. These results provide a unifying explanation of distributed cortical representations and interactions supporting reward and punishment learning.

<https://elifesciences.org/reviewed-preprints/92938>

Evolutionary Anthropology

ARTICLES

CHRISTOPHER J. BAE et al with LESLIE C. AIELLO, JOHN HAWK, & MIRJANA ROKSANDIC – Moving away from “the Muddle in the Middle” toward solving the Chibanian puzzle

No summary or abstract available.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.22011>

Frontiers in Ecology and Evolution

PAPERS

SETH PHILLIPS et al – A chimpanzee’s time to feast: seasonality of *Macrotermes* flight hole activity and alate dispersal flights detected by termite-fishing experiments and camera traps in the Issa Valley, Tanzania

Investigation into chimpanzee termite-fishing behavior has provided invaluable insights into the evolution of animal tool use and culture. However, research to date often overlooks how the ecology of termites may shape the nature of this predator–prey interaction. Though anecdotal links between meteorological factors, termite dispersal flights and the ability of chimpanzees to termite-fish have been made, these relationships were never empirically tested. In this study, we examined if and how the reproductive ecology of mound building termites (*Macrotermes subhyalinus*) affects the availability of this resource to termite-fishing chimpanzees in the Issa Valley, Tanzania.

We utilized in-person termite-fishing experiments, remote camera trap footage, as well as meteorological data to model both the availability of termite prey across seasons for chimpanzees as well as the timing of dispersal flights of the termite reproductive caste (alates). Additionally, we describe the predator diversity that characterizes alate swarming events during their seasonal dispersal flights.

We identify strong relationships between meteorological factors, *Macrotermes* alate dispersal flights and vulnerability of the colony to predation. As rainfall accumulates, *Macrotermes* become more abundant in their flight holes and are thus more vulnerable to researcher termite-fishing experiments. This increased accessibility to *Macrotermes* continues until alate dispersal flights which we also find are linked to cumulative rainfall as well as negatively correlated to wind speed.

This type of baseline data on *Macrotermes* ecology is fundamental when forming hypotheses and designing studies into topics such as chimpanzee culture, tool-use, and foraging cognition.

<https://www.frontiersin.org/articles/10.3389/fevo.2023.1289433/full>

Frontiers in Psychiatry

PAPERS

LINMING YAO et al – The role of the fronto-parietal network in modulating sustained attention under sleep deprivation: an functional magnetic resonance imaging study

The intricate relationship between sleep deprivation (SD) and cognitive performance has long been a subject of research. Our study offers a novel angle by closely examining the neurobiological underpinnings of sustained attention deficits through the lens of the fronto-parietal network (FPN). Using state-of-the-art imaging techniques, we delve into the changes in spontaneous brain activity after SD and explore their associations with performance on the psychomotor vigilance task (PVT). We conducted an elaborate investigation involving 64 healthy, right-handed participants who underwent resting-state functional MRI scans before and after experiencing 24 h of sleep deprivation. Employing sophisticated statistical analyses, we scrutinized the changes in fractional amplitude of low-frequency fluctuations (fALFF) through paired t-tests. Pearson correlation analyses were then applied to dissect the associations between these neurobiological shifts and behavioral outcomes in PVT.

The study yielded remarkable findings, revealing a dramatic decrease in fALFF values within critical areas of the FPN following SD. These alterations predominantly occurred in the frontal and parietal gyri and were inversely correlated with PVT performance metrics. Furthermore, we discovered that baseline fALFF values in the left dorsolateral prefrontal cortex (DLPFC) have the potential to serve as compelling neurobiological markers, with high discriminatory power in identifying individual responses to the adverse effects of SD on cognitive performance.

Our groundbreaking research underscores the pivotal role that the FPN plays in modulating attention and executive function, especially under the challenging conditions brought about by sleep deprivation. The findings offer critical insights that could shape the way we understand, assess, and potentially mitigate the cognitive impacts of SD, setting the stage for future research in this riveting domain.

<https://www.frontiersin.org/articles/10.3389/fpsyt.2023.1289300/full>

Mind & Language

PAPERS

FAUSTO CARCASSI & GIORGIO SBARDOLINI – Assertion, denial, and the evolution of Boolean operators

Given current data, only a few binary Boolean operators are expressed in lexically simple fashion in the world's languages: and, or, nor. These do not occur in every combination, for example, nor is not observed by itself. To explain these cross-linguistic patterns, we propose an encoding of Boolean operators as update procedures to accept or reject information in a context. We define a measure of conceptual simplicity for such updates, on which attested operators are conceptually simpler than the remaining Booleans. Moreover, we show that language evolution selects for the attested lexical inventories by minimizing the complexity of using a lexical inventory compositionally to convey precise information.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12448>

REGINA E. FABRY – Distributed autobiographical memories, distributed self-narratives

Richard Heersmink argues that self-narratives are distributed across embodied organisms and their environment, given that their building blocks, autobiographical memories, are distributed. This argument faces two problems. First, it commits a fallacy of composition. Second, it relies on Marya Schechtman's narrative self-constitution view, which is incompatible with the distributed cognition framework. To solve these problems, this article develops an alternative account of self-narratives. On this account, we actively connect distributed autobiographical memories through distributed conversational and textual self-narrative practices. This account enhances our understanding of the memory–narrative nexus and has implications for philosophical conceptions of self.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12453>

DAVID BALCARRAS – Is meaning cognized?

In this article, I defend an account of linguistic comprehension on which meaning is not cognized, or on which we do not tacitly know our language's semantics. On this view, sentence comprehension is explained instead by our capacity to translate sentences into the language of thought. I explain how this view can explain our capacity to correctly interpret novel utterances, and then I defend it against several standing objections.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12452>

COMMENTARIES

J. KILEY HAMLIN – Core morality? Or merely core agents and social beings? A response to Spelke's what babies know

Spelke's *What babies know* describes the remarkably sophisticated mental lives of infants through the theoretical framework of core knowledge. To Spelke, young infants possess six independent core domains, two of which allow them to reason about the social world: the core agent and the core social being systems. Critically, Spelke argues that these core systems fail to communicate prior to 10 months, resulting in an inability to understand social goals. In this commentary, I review evidence that, contrary to Spelke's claims, young infants show robust understanding of social goals and intentions, consistent with claims of an early emerging moral core.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12487>

ELIZABETH S. SPELKE – Core knowledge, language learning, and the origins of morality and pedagogy: Reply to reviews of *What babies know*

The astute reviews by Hamlin and by Revenu and Csibra provide compelling arguments and evidence for the early emergence of moral evaluation, communication, and pedagogical learning. I accept these conclusions but not the reviewers' claims that infants' talents in these domains depend on core systems of moral evaluation or pedagogical communication. Instead, I suggest that core knowledge of people as agents and as social beings, together with infants' emerging understanding of their native language, support learning about people as moral agents, moral patients, communicators, and teachers. These issues are open, however, and our competing views invite further testing.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12490>

Nature Communications

PAPERS

XIAOCHEN WANG et al – Imitation dynamics on networks with incomplete information

Imitation is an important learning heuristic in animal and human societies. Previous explorations report that the fate of individuals with cooperative strategies is sensitive to the protocol of imitation, leading to a conundrum about how different styles of imitation quantitatively impact the evolution of cooperation. Here, we take a different perspective on the personal and external social information required by imitation. We develop a general model of imitation dynamics with incomplete information in networked systems, which unifies classical update rules including the death-birth and pairwise-comparison rule on complex networks. Under pairwise interactions, we find that collective cooperation is most promoted if individuals neglect personal information. If personal information is considered, cooperators evolve more readily with more external information. Intriguingly, when interactions take place in groups on networks with low degrees of clustering, using more

personal and less external information better facilitates cooperation. Our unifying perspective uncovers intuition by examining the rate and range of competition induced by different information situations.

<https://www.nature.com/articles/s41467-023-43048-x>

J. SCHIFERL et al – A neotropical perspective on the uniqueness of the Holocene among interglacials

Understanding how tropical systems have responded to large-scale climate change, such as glacial-interglacial oscillations, and how human impacts have altered those responses is key to current and future ecology. A sedimentary record recovered from Lake Junín, in the Peruvian Andes (4085 m elevation) spans the last 670,000 years and represents the longest continuous and empirically-dated record of tropical vegetation change to date. Spanning seven glacial-interglacial oscillations, fossil pollen and charcoal recovered from the core showed the general dominance of grasslands, although during the warmest times some Andean forest trees grew above their modern limits near the lake. Fire was very rare until the last 12,000 years, when humans were in the landscape. Here we show that, due to human activity, our present interglacial, the Holocene, has a distinctive vegetation composition and ecological trajectory compared with six previous interglacials. Our data reinforce the view that modern vegetation assemblages of high Andean grasslands and the presence of a defined tree line are aspects of a human-modified landscape.

<https://www.nature.com/articles/s41467-023-43231-0>

Nature Neuroscience

PAPERS

RYOMA HATTORI et al – Meta-reinforcement learning via orbitofrontal cortex

The meta-reinforcement learning (meta-RL) framework, which involves RL over multiple timescales, has been successful in training deep RL models that generalize to new environments. It has been hypothesized that the prefrontal cortex may mediate meta-RL in the brain, but the evidence is scarce. Here we show that the orbitofrontal cortex (OFC) mediates meta-RL. We trained mice and deep RL models on a probabilistic reversal learning task across sessions during which they improved their trial-by-trial RL policy through meta-learning. Ca²⁺/calmodulin-dependent protein kinase II-dependent synaptic plasticity in OFC was necessary for this meta-learning but not for the within-session trial-by-trial RL in experts. After meta-learning, OFC activity robustly encoded value signals, and OFC inactivation impaired the RL behaviors. Longitudinal tracking of OFC activity revealed that meta-learning gradually shapes population value coding to guide the ongoing behavioral policy. Our results indicate that two distinct RL algorithms with distinct neural mechanisms and timescales coexist in OFC to support adaptive decision-making.

<https://www.nature.com/articles/s41593-023-01485-3>

Nature Scientific Reports

PAPERS

SABINE GAUDZINSKI-WINDHEUSER, LUTZ KINDLER & WIL ROEBROEKS – Beaver exploitation, 400,000 years ago, testifies to prey choice diversity of Middle Pleistocene hominins

Data regarding the subsistence base of early hominins are heavily biased in favor of the animal component of their diets, in particular the remains of large mammals, which are generally much better preserved at archaeological sites than the bones of smaller animals, let alone the remains of plant food. Exploitation of smaller game is very rarely documented before the latest phases of the Pleistocene, which is often taken to imply narrow diets of archaic Homo and interpreted as a striking economic difference between Late Pleistocene and earlier hominins. We present new data that contradict this view of Middle Pleistocene Lower Palaeolithic hominins: cut mark evidence demonstrating systematic exploitation of beavers, identified in the large faunal assemblage from the c. 400,000 years old hominin site Bilzingsleben, in central Germany. In combination with a prime-age dominated mortality profile, this cut mark record shows that the rich beaver assemblage resulted from repetitive human hunting activities, with a focus on young adult individuals. The Bilzingsleben beaver exploitation evidence demonstrates a greater diversity of prey choice by Middle Pleistocene hominins than commonly acknowledged, and a much deeper history of broad-spectrum subsistence than commonly assumed, already visible in prey choices 400,000 years ago.

<https://www.nature.com/articles/s41598-023-46956-6>

RAQUEL GRANJA et al with DAVID GONÇALVES – Unbalanced sex-ratio in the Neolithic individuals from the Escoural Cave (Montemor-o-Novo, Portugal) revealed by peptide analysis

The sex profile estimation of pre-historic communities is often complicated by the commingled and scattered nature of skeletal assemblages. Demographic profiles are usually lacking and provide very truncated representations of these populations but proteomic analysis of sex-specific amelogenin peptides in tooth enamel brings new promise to these studies. The main objective was to obtain the sex profile of the human assemblage recovered from the Neolithic cave-necropolis of Escoural (Montemor-o-Novo, southern Portugal) through liquid chromatography-mass spectrometry. The secondary objective was to analyse sex-specific linear enamel hypoplasias (LEH), and to test the reliability of canine odontometric sex estimation. Sex estimation through peptide analysis was carried out in 36 left permanent canines which were

macroscopically examined for the presence of LEH. The canine buccolingual diameter was used for odontometric sex estimation. The obtained sex ratio (0.5:1, M:F) is biased to female individuals, probably due to cultural factors since the natural sex ratio of the human population falls between 0.95:1 and 1.02:1 (M:F). A high frequency of LEH was observed, but with no significant sexual differences ($p = 0.554$). The mean LEH age of onset occurred at 3 years of age, with no significant differences between the sexes ($p = 0.116$), and was possibly related to the weaning process. Odontometric sex estimation revealed a correct classification of 80%, with a high number of males mistakenly attributed to females. This study is one of the largest samples subjected to peptide analysis, and thus demonstrates its usefulness on the research of commingled and scattered skeletal assemblages.

<https://www.nature.com/articles/s41598-023-47037-4>

New Scientist

NEWS

How archaeologists can decide if prehistoric artefacts count as art

To make sense of aesthetically pleasing ancient objects and what they tell us about how their creators thought, archaeologists must temper imagination with science.

<https://www.newscientist.com/article/mg26034652-800-how-archaeologists-can-decide-if-prehistoric-artefacts-count-as-art/>

Ancient Europe was half covered by savannah and grazed by elephants

It is widely assumed that Europe used to be covered by dense, unbroken forests, but ancient pollen shows half was grassland or light woodland.

<https://www.newscientist.com/article/2402214-ancient-europe-was-half-covered-by-savannah-and-grazed-by-elephants/>

ARTICLES

KATE DOUGLAS – The archaeological finds that show art is far older than our species

We used to trace the origins of art to Stone Age Europe. Now we have evidence of artistic sensibility in earlier hominins, from Neanderthals to Homo erectus and beyond.

<https://www.newscientist.com/article/mg26034650-500-the-archaeological-finds-that-show-art-is-far-older-than-our-species/>

Philosophical Transactions of the Royal Society B

PAPERS

MAURICIO LIMA et al – Positive feedbacks in deep-time transitions of human populations

Abrupt and rapid changes in human societies are among the most exciting population phenomena. Human populations tend to show rapid expansions from low to high population density along with increased social complexity in just a few generations. Such demographic transitions appear as a remarkable feature of Homo sapiens population dynamics, most likely fuelled by the ability to accumulate cultural/technological innovations that actively modify their environment. We are especially interested in establishing if the demographic transitions of pre-historic populations show the same dynamic signature of the Industrial Revolution transition (a positive relationship between population growth rates and size). Our results show that population growth patterns across different pre-historic societies were similar to those observed during the Industrial Revolution in developed western societies. These features, which appear to have been operating during most of our recent demographic history from hunter–gatherers to modern industrial societies, imply that the dynamics of cooperation underlay sudden population transitions in human societies.

<https://royalsocietypublishing.org/doi/10.1098/rstb.2022.0256>

PLoS Biology

PAPERS

SYLVAIN R. T. LEMOINE, LIRAN SAMUNI, CATHERINE CROCKFORD & ROMAN M. WITTIG – Chimpanzees make tactical use of high elevation in territorial contexts

Tactical warfare is considered a driver of the evolution of human cognition. One such tactic, considered unique to humans, is collective use of high elevation in territorial conflicts. This enables early detection of rivals and low-risk maneuvers, based on information gathered. Whether other animals use such tactics is unknown. With a unique dataset of 3 years of simultaneous behavioral and ranging data on 2 neighboring groups of western chimpanzees, from the Tai National Park, Côte d'Ivoire, we tested whether chimpanzees make decisions consistent with tactical use of topography to gain an advantage over rivals. We show that chimpanzees are more likely to use high hills when traveling to, rather than away from, the border where conflict typically takes place. Once on border hills, chimpanzees favor activities that facilitate information gathering about rivals. Upon leaving hills, movement decisions conformed with lowest risk engagement, indicating that higher elevation facilitates the detection of rivals presence or absence. Our results support the idea that elevation use facilitated rival information gathering and appropriate tactical maneuvers. Landscape use during territorial maneuvers in natural contexts suggests

chimpanzees seek otherwise inaccessible information to adjust their behavior and points to the use of sophisticated cognitive abilities, commensurate with selection for cognition in species where individuals gain benefits from coordinated territorial defense. We advocate territorial contexts as a key paradigm for unpicking complex animal cognition.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002350>

PLoS One

PAPERS

KATRIN ROTHMALER & CHARLOTTE GROSSE WIESMANN – Evidence against implicit belief processing in a blindfold task

Understanding what other people think is crucial to our everyday interactions. We seem to be affected by the perspective of others even in situations where it is irrelevant to us. This intrusion from others' perspectives has been referred to as altercentric bias and has been suggested to reflect implicit belief processing. There is an ongoing debate about how robust such altercentric effects are and whether they indeed reflect true mentalizing or result from simpler, domain-general processes. As a critical test for true mentalizing, the blindfold manipulation has been proposed. That is, participants are familiarized with a blindfold that is either transparent or opaque. When they then observe a person wearing this blindfold, they can only infer what this person can or cannot see based on their knowledge of the blindfold's transparency. Here, we used this blindfold manipulation to test whether participants' reaction times in detecting an object depended on the agent's belief about the object's location, itself manipulated with a blindfold. As a second task, we asked participants to detect where the agent was going to look for the object. Across two experiments with a large participant pool (N = 234) and different settings (online/lab), we found evidence against altercentric biases in participants' response times in detecting the object. We did, however, replicate a well-documented reality congruency effect. When asked to detect the agent's action, in turn, participants were biased by their own knowledge of where the object should be, in line with egocentric biases previously found in false belief reasoning. These findings suggest that altercentric biases do not reflect belief processing but lower-level processes, or alternatively, that implicit belief processing does not occur when the belief needs to be inferred from one's own experience.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0294136>

RUQIN REN & JIA HE – Network traits driving knowledge evolution in open collaboration systems

Network interpretation illuminates our understanding of the dynamic nature of cultural evolution. Guided by cultural evolution theory, this article explores how people collectively develop knowledge through knowledge collaboration network traits. Using network data from 910 artifacts (the WikiProject Aquarium Fishes articles) over 163 weeks, two studies were designed to understand how collaboration network traits drive population and artifact-level knowledge evolution. The first study examines the selection pressure imposed by 10 network traits (against 11 content traits) on population-level evolutionary outcomes. While network traits are vital in identifying natural selection pressure, intriguingly, no significant difference was found between network traits and content traits, challenging a recent theory on network-driven evolution. The second study utilizes time series analysis to reveal that three network traits (embeddedness, connectivity, and redundancy) at a prior time predict future artifact development trajectory. This implies that people collectively explore various positions in a potential solution space, suggesting content exploration as a possible explanation of knowledge evolution. In summary, understanding the interplay between network traits and content exploration provides valuable insights into the mechanisms driving knowledge evolution and offers new avenues for future research.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0291097>

Proceedings of the Royal Society B

PAPERS

GIOVANNI NAZZARO et al – The microstructure of intra- and interpersonal coordination

Movements are naturally composed of submovements, i.e. recurrent speed pulses (2–3 Hz), possibly reflecting intermittent feedback-based motor adjustments. In visuomotor (unimanual) synchronization tasks, partners alternate submovements over time, indicating mutual coregulation. However, it is unclear whether submovement coordination is organized differently between and within individuals. Indeed, different types of information may be variably exploited for intrapersonal and interpersonal coordination. Participants performed a series of bimanual tasks alone or in pairs, with or without visual feedback (solo task only). We analysed the relative timing of submovements between their own hands or between their own hands and those of their partner. Distinct coordinative structures emerged at the submovement level depending on the relevance of visual feedback. Specifically, the relative timing of submovements (between partners/ effectors) shifts from alternation to simultaneity and a mixture of both when coordination is achieved using vision (interpersonal), proprioception/ efference-copy only (intrapersonal, without vision) or all information sources (intrapersonal, with vision), respectively. These results suggest that submovement coordination represents a behavioural proxy for the adaptive weighting of different sources of information within action-perception loops. In sum, the microstructure of movement reveals common principles governing the dynamics of sensorimotor control to achieve both intra- and interpersonal coordination.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.1576>

ILARIA PRETELLI et al – Foraging and the importance of knowledge in Pemba, Tanzania: implications for childhood evolution

Childhood is a period of life unique to humans. Childhood may have evolved through the need to acquire knowledge and subsistence skills. In an effort to understand the functional significance of childhood, previous research examined increases with age in returns to foraging across food resources. Such increases could be due to changes in knowledge, or other factors such as body size or strength. Here, we attempt to unpack these age-related changes. First, we estimate age-specific foraging returns for two resources. We then develop nonlinear structural equation models to evaluate the relative importance of ecological knowledge, grip strength and height in a population of part-time children foragers on Pemba island, Tanzania. We use anthropometric measures (height, strength, $n = 250$), estimates of ecological knowledge ($n = 93$) and behavioural observations for 63 individuals across 370 foraging trips. We find slower increases in foraging returns with age for trap hunting than for shellfish collection. We do not detect any effect of individual knowledge on foraging returns, potentially linked to information sharing within foraging parties. Producing accurate estimates of the distinct contribution of specific traits to an individual's foraging performance constitutes a key step in evaluating different hypotheses for the emergence of childhood.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.1505>

BENCE CSABA FARKAS & PIERRE OLIVIER JACQUET – Early life adversity jointly regulates body-mass index and working memory development

Previous work has proposed that balancing energy expenditure towards body and brain development in an optimal fashion results in a negative relationship between somatic and neurocognitive growth during development. An important issue, largely overlooked so far, is the extent to which this energetic trade-off is influenced by early life environmental factors. In this study, we estimated the association between neurocognitive (measured by working memory ability) and somatic (measured by body-mass index) developmental trajectories, while taking into account multiple dimensions of early life adversity. Results of our initial growth curve model were consistent with this brain–body trade-off in both girls and boys. In a subsequent model, we showed that early life adversity had positive associations with somatic and negative associations with neurocognitive growth trajectories, although the direct negative coupling between them remained consistent. Finally, a multidimensional adversity model, separating the effects of deprivation, threat and unpredictability, revealed that the dimension of deprivation—reflecting lack of access to resources and cognitive stimulation—contributed the most to both somatic and neurocognitive growth patterns. These results suggest that the way individuals balance energy between these two biological constructs during development is partly linked to environmental influences through phenotypic plasticity.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.1945>

Science

ARTICLES

AGUSTÍN FUENTES – Humans are biocultural, science should be too

COVID-19 is restructuring societies. Loneliness is a global health threat. Large language models are outputting biased health care information, and human–artificial intelligence (AI) interfaces are reshaping how we live. For most humans, technology, biology, and society are hopelessly entangled. Are the sciences prepared to tackle the contemporary human experience?

<https://www.science.org/doi/full/10.1126/science.adl1517>

JOAN B. SILK – Between-group cooperation in bonobos

Scientific reconstructions of the behavior of the ancestors of modern humans are informed by evidence from fossils, ancient artifacts, genomes of ancient and modern peoples, and the behavior of living nonhuman primates. Chimpanzees (*Pan troglodytes*) and bonobos (*Pan paniscus*) play an especially important role in these efforts because they are the closest living relatives of modern humans. However, it is becoming increasingly clear that reconstructions based on studies of chimpanzees and bonobos look very different. On page 805 of this issue, Samuni and Surbeck (1) present data about one important element of the divergent story lines—the propensity of bonobos to engage in friendly interactions with members of neighboring groups.

<https://www.science.org/doi/full/10.1126/science.adl1813>

PAPERS

LIRAN SAMUNI & MARTIN SURBECK – Cooperation across social borders in bonobos

Cooperation beyond familial and group boundaries is core to the functioning of human societies, yet its evolution remains unclear. To address this, we examined grooming, coalition, and food-sharing patterns in bonobos (*Pan paniscus*), one of our closest living relatives whose rare out-group tolerance facilitates interaction opportunities between groups. We show that, as in humans, positive assortment supports bonobo cooperation across borders. Bonobo cooperative attitudes toward in-group members informed their cooperative relationships with out-groups, in particular, forming connections with out-group individuals who also exhibited high cooperation tendencies. Our findings show that cooperation between unrelated

individuals across groups without immediate payoff is not exclusive to humans and suggest that such cooperation can emerge in the absence of social norms or strong cultural dispositions.

<https://www.science.org/doi/10.1126/science.adg0844>

Trends in Cognitive Sciences

PAPERS

YINGTAO FU ET AL – Attention with or without working memory: mnemonic reselection of attended information

Attention has been regarded as the ‘gatekeeper’ controlling what information gets selected into working memory. However, a new perspective has emerged with the discovery of attribute amnesia, a phenomenon revealing that people are frequently unable to report information they have just attended to moments ago. This report failure is thought to stem from a lack of consolidating the attended information into working memory, indicating a dissociation between attention and working memory. Building on these findings, a new concept called memory reselection is proposed to describe a secondary round of selection among the attended information. These discoveries challenge the conventional view of how attention and working memory are related and shed new light onto modeling attention and memory as dissociable processes.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00206-1](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00206-1)

GIOVANNI PEZZULO et al with ANDY CLARK – Generating meaning: active inference and the scope and limits of passive AI

Prominent accounts of sentient behavior depict brains as generative models of organismic interaction with the world, evincing intriguing similarities with current advances in generative artificial intelligence (AI). However, because they contend with the control of purposive, life-sustaining sensorimotor interactions, the generative models of living organisms are inextricably anchored to the body and world. Unlike the passive models learned by generative AI systems, they must capture and control the sensory consequences of action. This allows embodied agents to intervene upon their worlds in ways that constantly put their best models to the test, thus providing a solid bedrock that is – we argue – essential to the development of genuine understanding. We review the resulting implications and consider future directions for generative AI.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00260-7](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00260-7)

KYLE FIORE LAW et al – Ethical reasoning versus empathic bias: a false dichotomy?

Does empathy necessarily impede equity in altruism? Emerging findings from cognitive and affective science suggest that rationality and empathy are mutually compatible, contradicting some earlier, prominent arguments that empathy impedes equitable giving. We propose alternative conceptualizations of relationships among empathy, rationality, and equity, drawing on interdisciplinary advances in altruism research.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00264-4](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00264-4)

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