

## EAORC BULLETIN 1,074 – 14 January 2024

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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.

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### EDITORIAL INTERJECTIONS

Comments in curly brackets are editorial interjections. The Editor reserves the right to be wrong.

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### CONFERENCE ALERT – Life is plastic

***Life is plastic: How phenotypic plasticity makes us rethink central problems in biology.***

We are pleased to announce the Conference Jacques Monod (CJM) held in Roscoff (Brittany, France), from 17 to 21 June 2024.

CJMs are organized by the CNRS, and include ~100 participants who all present their work (either by oral presentation or poster) to foster scientific exchange. The list of invited speakers is available at this page:

<https://www.insb.cnrs.fr/fr/life-plastic-how-phenotypic-plasticity-makes-us-rethink-central-problems-biology>

The conference venue is a historical marine biology station in a beautiful village in Brittany:

[https://en.wikipedia.org/wiki/Station\\_biologique\\_de\\_Roscoff](https://en.wikipedia.org/wiki/Station_biologique_de_Roscoff)

Registration, which involves a selection step, is open until March 11th here:

<https://cjm2-2024.sciencesconf.org/?forward-action=index&forward-controller=index&lang=en>

Note that registration fees include accommodation and meals.

Looking forward to seeing you there!

Luis-Miguel Chevin et Cameron Ghalambor

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### OTHER EAORC – Angela Saini : The Patriarchs: The Origins of Inequality

In EAORC Bulletin 1,067 I said that I could not find the link to Angela Saini’s podcast about her book, ‘The Patriarchs: The Origins of Inequality’. So many thanks to **Nikolaus Boroffka** for spotting this e-page:

<https://podcasts.apple.com/ca/podcast/angela-saini-the-patriarchs-the-origins-of-inequality/id267898471?i=1000606637158>

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## NEWS

### NATURE BRIEFING – Misinformation exploits ‘information voids’

The more people are exposed to something, the more they perceive it to be true — regardless of its veracity. “This phenomenon pre-dates the digital age,” notes a Nature editorial. “The difference now is that online search and social media enable claims and counterclaims to be made almost endlessly.” The existence of ‘data voids’, where trustworthy information is lacking for some search terms, is part of the issue. “Genuine, lasting solutions to a problem that could be existential for democracies needs to be a partnership between search-engine providers and sources of evidence-based knowledge,” argues the editorial.

<https://www.nature.com/articles/d41586-024-00030-x>

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### NATURE BRIEFING – When plagiarism is wielded as a weapon

Accusations of plagiarism have long been a part of the political arsenal, writes copyright and plagiarism consultant Jonathan Bailey. But recent high-profile cases are raising fears about how it can be wielded to destroy reputations, rather than improve academic integrity. Harvard president Claudine Gay resigned last week amid plagiarism allegations that some feel were politically motivated. Billionaire Bill Ackman has since escalated his spat with the Massachusetts Institute of Technology (MIT) by saying he will sponsor a “review of the work of all current MIT faculty members”. “The fear is that this weaponization of plagiarism will result not in the public taking plagiarism more seriously, but less,” argues Bailey.

When academic Ian Bogost ran his thesis through the plagiarism-detection wringer, it took hours of work to comb through the red flags. “The result of my experiment brought me no relief, only a new anxiety,” says Bogost. A rise in “bad actors who seek to undermine educational institutions and their leaders... isn’t likely to improve academic work, but it would certainly make higher education worse.”

<https://www.plagiarismtoday.com/2024/01/08/the-weaponization-of-plagiarism-2/>

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### NATURE BRIEFING – European traits come from ancient migrants

A huge cache of ancient genomes spanning tens of thousands of years has revealed that many traits of modern Europeans had their roots elsewhere. Researchers identified characteristics brought by three main waves of human migration into the continent — hunter-gatherers from Asia around 45,000 years ago; farmers from the Middle East 11,000 years ago; and animal herders from the steppes of western Asia and eastern Europe 5,000 years ago. The latter brought genes for greater height and lighter skin to Northern Europe, as well as a heightened risk for multiple sclerosis. Northeastern Europeans, who tend to have the most hunter-gatherer ancestry, have variants that put them at higher risk of diabetes and Alzheimer’s disease.

<https://www.nature.com/articles/d41586-024-00024-9>

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### SAPIENS – What Is “Natural” for Human Sexual Relationships?

“Marrying more than one person constitutes a crime across most of the Americas and Europe. But in countries including Mali, Gambia, and Nigeria, more than a quarter of the population lives in polygamous households.

Survey the sex lives of Homo sapiens, and you’ll find couples, throuples, harems, and other arrangements of lovers. Fidelity, adultery, and ethically non-monogamous unions. How could one species have evolved myriad ways to mate? Concerning sex, what is natural for us humans?

As an evolutionary biologist and anthropologist, I am often asked that question. The answer is complex.”

<https://www.sapiens.org/biology/human-mating-relationships/>

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### SAPIENS – How “Wilderness” Was Invented Without Indigenous Peoples

New research reveals how human activity need not always damage nature and may even benefit conservation—a message tied to Indigenous understandings that runs counter to the West’s longstanding myth of “pristine wilderness.”

<https://www.sapiens.org/culture/pristine-wilderness-conservation/>

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### SCIENCEADVISER – Manipulating neural circuits makes monkeys take more or fewer risks

A gambler in Las Vegas has to decide how much they’re willing to risk: place large bets and increase the chances of a big win—or a devastating loss. Or play it safe, but win little. While context can strongly influence a person’s attitude toward risk, not much is known about the brain structures underlying these decisions.

Now, researchers have identified neural pathways that control risk-taking behavior in monkeys. Macaques were asked to choose between two circles, one representing a high probability of receiving a small reward, and the other a low probability of a larger reward. As in other studies on these animals, the monkeys proved risky gamblers, often choosing the high-risk, high-return option. That is, until researchers used a sedative to “turn off” a region of the brain known as area 6V. Then the monkeys stopped making decisions based on risk altogether. Further examination revealed a pair of neural circuits that connect area 6V to a group of neurons in the midbrain. Activating one of these circuits made the monkeys take more risks. The other, meanwhile, made the animals more risk averse.

These findings suggest that these regions “regulate risk attitude in a competitive push-pull-like fashion,” neuroscientist Veit Stuphorn explains in a related Perspective. They may also shed light on the neural underpinnings of gambling disorders and other pathological forms of risk-taking, the study authors write, and therefore could aid the development of new treatments. <https://www.science.org/doi/10.1126/science.adm8641>

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### SCIENCEADVISER – Ancient monsoons rolled out the green carpet for humans exiting Africa

Our species evolved in Africa some 300,000 years ago, but fossil evidence suggests people didn't begin migrating into East Asia until around 100,000 years ago. What took them so long? A new analysis of ancient climate conditions suggests these eastbound migrants had to wait until a strengthening monsoon pattern across southern Asia rolled out a green carpet for them.

Before about 125,000 years ago, people journeying east out of the African continent would have encountered cold, arid conditions inhospitable to modern humans. But then, a lot changed—including greenhouse gas concentrations, the volume of ice covering the Northern Hemisphere, and the intensity of sunlight reaching Earth, ultimately governed by the planet's tilt, wobble, and solar orbit. Combined, these increased heat and rainfall across the region, and this new climate produced a green corridor, the authors argue, that would have proven irresistible to hunter-gatherers at the time, drawing them into East Asia.

“Now we can confidently add rain and water to the equation that makes environment more suitable for *H. sapiens* settlement,” says anthropologist and study author María Martín-Torres.

<https://www.science.org/content/article/strong-monsoons-may-have-carved-path-early-humans-out-africa>

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### SCIENCEADVISER – AI self-talk

An “inner monologue” can help a machine learn to perform complex tasks more reliably, according to work presented at last month's Neural Information Processing Systems conference in New Orleans.

<https://www.science.org/content/article/artificial-intelligence-may-benefit-talking-itself>

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### SCIENCEADVISER – What killed off the world's biggest primate?

In 1935, an anthropologist found a “dragon tooth” for sale in a Hong Kong traditional medicine shop. He recognized it as a primate's—but a giant one. As more teeth and jawbone fossils turned up in caves throughout southern China, researchers concluded that they belonged to a massive, extinct ape, which they named *Gigantopithecus blacki*. Estimating its size based on their comparisons to known primates, they determined *G. blacki* stood three meters tall and weighed some 250 kg—the largest primate ever to walk the earth.

What drove this giant to extinction? That's a question that has puzzled researchers ever since its discovery. After all, 2.3 million years ago, it lived alongside a species of orangutan whose relatives are still alive today. Now, researchers say they have the answer: It was too big and too picky an eater to adapt as climate change altered forest conditions.

When *G. blacki*'s preferred food—fruits—became scarce, it switched to eating less nutritious bark and twigs. Its massive body prevented it from climbing and chasing small prey. Over time, this poor diet took its toll, and their population plummeted before finally going extinct. Meanwhile, the smaller orangutans successfully expanded their diet to include treetop shoots and leaves, insects, and small animals.

<https://www.science.org/content/article/we-may-finally-know-why-world-s-largest-primate-went-extinct>

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### SCIENCE.ORG NEWS – Half a million people may have called this ancient seabed home

A now-drowned area northwest of Australia likely supported hundreds of thousands of humans when sea levels were lower.

<https://www.science.org/content/article/half-million-people-may-have-called-ancient-seabed-home>

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### SCIENCE.ORG NEWS – Billionaire launches plagiarism detection effort against MIT president and faculty

Angered by media exposé of his wife's work, Bill Ackman also vows to audit faculty of other elite schools.

<https://www.science.org/content/article/billionaire-launches-plagiarism-detection-effort-against-mit-president-and-all-its>

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### THE CONVERSATION – Plagiarism is not always easy to define or detect

About two-thirds of students admit to plagiarizing material. Faculty are expected to know better, but they do it, too. How should universities respond?

<https://theconversation.com/plagiarism-is-not-always-easy-to-define-or-detect-220592>

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## PUBLICATIONS

### American Journal of Biological Anthropology

#### PAPERS

##### **PATRICK MAHONEY et al with LEE BERGER – Human-like enamel growth in *Homo naledi***

A modern pattern (rate and duration) of dental development occurs relatively recently during human evolution. Given the temporal overlap of *Homo naledi* with the first appearance of fossil *Homo sapiens* in Africa, this small-bodied and small-brained hominin presents an opportunity to elucidate the evolution of enamel growth in the hominin clade. Here we conduct the first histological study of two permanent mandibular canines and one permanent maxillary first molar, representing three individuals attributed to *H. naledi*. We reconstruct the rate and duration of enamel growth and compare these findings to those reported for other fossil hominins and recent humans.

Thin sections of each tooth were produced using standard histological methods. Daily and longer period incremental markings were measured to reconstruct enamel secretion and extension rates, Retzius periodicity, canine crown and molar cusp formation time.

Daily enamel secretion rates overlapped with those from recent hominins. Canine crown formation time is similar to that observed in recent Europeans but is longer than canine formation times reported for most other hominins including *Australopithecus* and *H. neanderthalensis*. The extended period of canine formation appears to be due to a relatively tall enamel crown and a sustained slow rate of enamel extension in the cervical portion of the crown. A Retzius periodicity of 11 days for the canines, and nine days for the molar, in *H. naledi* parallel results found in recent humans. An 11-day periodicity has not been reported for Late Pleistocene *Homo* (*H. erectus*, *H. neanderthalensis*) and is rarely found in *Australopithecus* and *Paranthropus* species.

Enamel growth of *H. naledi* is most similar to recent humans though comparative data are limited for most fossil hominin species. The high Retzius periodicity values do not follow expectations for a small-brained hominin.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24893>

##### **FRANÇOIS DRUELLE et al – Vertical climbing in free-ranging bonobos: An exploratory study integrating locomotor performance and substrate compliance**

Ecological factors and body size shape animal movement and adaptation. Large primates such as bonobos excel in navigating the demanding substrates of arboreal habitats. However, current approaches lack comprehensive assessment of climbing performance in free-ranging individuals, limiting our understanding of locomotor adaptations. This study aims to explore climbing performance in free-ranging bonobos and how substrate properties affect their behavior.

We collected data on the climbing performance of habituated bonobos, *Pan paniscus*, in the Bolobo Territory, Democratic Republic of Congo. We analyzed 46 climbing bouts (12 ascents, 34 descents) while moving on vertical substrates of varying diameter and compliance levels. This study assessed the average speed, peak acceleration, resting postures, and transitions between climbing and other locomotor modes.

During climbing sequences and transitions, bonobos mitigate speed variations. They also exhibit regular pauses during climbing and show higher speeds during descent in contrast to their ascent. Regarding the influence of substrate properties, bonobos exhibit higher speed when ascending on thin and slightly flexible substrates, while they appear to achieve higher speeds when descending on large and stiff substrates, by using a “fire-pole slide” submode.

Bonobos demonstrate remarkable abilities for negotiating vertical substrates and substrate properties influence their performance. Our results support the idea that bonobos adopt a behavioral strategy that aligns with the notion of minimizing costs. Overall, the adoption of high velocities and the use of low-cost resting postures may reduce muscle fatigue. These aspects could represent important targets of selection to ensure ecological efficiency in bonobos.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24894>

##### **DAVID M. SCHRUTH et al – The origins of musicality in the motion of primates**

Animals communicate acoustically to report location, identity, and emotive state to conspecifics. Acoustic signals can also function as displays to potential mates and as territorial advertisement. Music and song are terms often reserved only for humans and birds, but elements of both forms of acoustic display are also found in non-human primates. While culture, bonding, and side-effects all factor into the emergence of musicality, biophysical insights into what might be signaled by specific acoustic features are less well understood.

Here we probe the origins of musicality by evaluating the links between musical features (structural complexity, rhythm, interval, and tone) and a variety of potential ecological drivers of its evolution across primate species. Alongside other hypothesized causes (e.g. territoriality, sexual selection), we evaluated the hypothesis that perilous arboreal locomotion might favor musical calling in primates as a signal of capacities underlying spatio-temporal precision in motor tasks.

We used musical features found in spectrographs of vocalizations of 58 primate species and corresponding measures of locomotion, diet, ranging, and mating. Leveraging phylogenetic information helped us impute missing data and control for relatedness of species while selecting among candidate multivariate regression models.

Results indicated that rapid inter-substrate arboreal locomotion is highly correlated with several metrics of music-like signaling. Diet, alongside mate-choice and range size, emerged as factors that also correlated with complex calling patterns.



These results support the hypothesis that musical calling may function as a signal, to neighbors or potential mates, of accuracy in landing on relatively narrow targets.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24891>

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## Cell

### PAPERS

#### **DELILAH HENDRIKS et al – Human fetal brain self-organizes into long-term expanding organoids**

Human brain development involves an orchestrated, massive neural progenitor expansion while a multi-cellular tissue architecture is established. Continuously expanding organoids can be grown directly from multiple somatic tissues, yet to date, brain organoids can solely be established from pluripotent stem cells. Here, we show that healthy human fetal brain in vitro self-organizes into organoids (FeBOs), phenocopying aspects of in vivo cellular heterogeneity and complex organization. FeBOs can be expanded over long time periods. FeBO growth requires maintenance of tissue integrity, which ensures production of a tissue-like extracellular matrix (ECM) niche, ultimately endowing FeBO expansion. FeBO lines derived from different areas of the central nervous system (CNS), including dorsal and ventral forebrain, preserve their regional identity and allow to probe aspects of positional identity. Using CRISPR-Cas9, we showcase the generation of syngeneic mutant FeBO lines for the study of brain cancer. Taken together, FeBOs constitute a complementary CNS organoid platform.

[https://www.cell.com/cell/fulltext/S0092-8674\(23\)01344-2](https://www.cell.com/cell/fulltext/S0092-8674(23)01344-2)

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## Current Biology

### ARTICLES

#### **MEGAN R. CAREY – The cerebellum**

The cerebellum, that stripey ‘little brain’, sits at the back of your head, under your visual cortex, and contains more than half of the neurons in your entire nervous system. The cerebellum is highly conserved across vertebrates, and its evolutionary expansion has tended to proceed in concert with expansion of cerebral cortex. The crystalline neuronal architecture of the cerebellar cortex was first described by Cajal a century ago, and its functional connectivity was elucidated in exquisite anatomical and physiological detail by the mid-20th century. The ability to clearly identify molecularly distinct cerebellar cell types that constitute discrete circuit elements is perhaps unparalleled among brain areas, even within the context of modern circuit neuroscience. Although traditionally thought of as primarily a motor structure, the cerebellum is highly interconnected with diverse brain areas and, as I will explain in this Primer, is well-poised to influence a wide range of motor and cognitive functions.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)01633-0](https://www.cell.com/current-biology/fulltext/S0960-9822(23)01633-0)

#### **ALEX H. TAYLOR – Animal behaviour: Darwin’s mischievous hat stealers are innovative problem solvers**

A new study shows a falcon species, the striated caracara, displays similar levels of behavioural innovation to tool-using parrots when solving a battery test in the wild.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)01574-9?dgcid=raven\\_jbs\\_etoc\\_email](https://www.cell.com/current-biology/fulltext/S0960-9822(23)01574-9?dgcid=raven_jbs_etoc_email)

### PAPERS

#### **KATIE J. HARRINGTON et al with ALICE M.I. AUERSPERG – Innovative problem solving by wild falcons**

Innovation (i.e., a new solution to a familiar problem, or applying an existing behavior to a novel problem) plays a fundamental role in species’ ecology and evolution. It can be a useful measure for cross-group comparisons of behavioral and cognitive flexibility and a proxy for general intelligence. Among birds, experimental studies of innovation (and cognition more generally) are largely from captive corvids and parrots, though we lack serious models for avian technical intelligence outside these taxa. Striated caracaras (*Phalcoboenus australis*) are Falconiformes, sister clade to parrots and passerines, and those endemic to the Falkland Islands (Malvinas) show curiosity and neophilia similar to notoriously neophilic kea parrots and face similar socio-ecological pressures to corvids and parrots. We tested wild striated caracaras as a new avian model for technical cognition and innovation using a field-applicable 8-task comparative paradigm (adapted from Rössler et al. and Auersperg et al.). The setup allowed us to assess behavior, rate, and flexibility of problem solving over repeated exposure in a natural setting. Like other generalist species with low neophobia, we predicted caracaras to demonstrate a haptic approach to solving tasks, flexibly switching to new, unsolved problems and improving their performance over time. Striated caracaras performed comparably to tool-using parrots, nearly reaching ceiling levels of innovation in few trials, repeatedly and flexibly solving tasks, and rapidly learning. We attribute our findings to the birds’ ecology, including geographic restriction, resource unpredictability, and opportunistic generalism, and encourage future work investigating their cognitive abilities in the wild.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)01462-8](https://www.cell.com/current-biology/fulltext/S0960-9822(23)01462-8)

**PAUL A.G. FORBES et al – Acute stress reduces effortful prosocial behaviour**

Acute stress can change our cognition and emotions, but what specific consequences this has for human prosocial behaviour is unclear. Previous studies have mainly investigated prosociality with financial transfers in economic games and produced conflicting results. Yet a core feature of many types of prosocial behaviour is that they are effortful. We therefore examined how acute stress changes our willingness to exert effort that benefits others. Healthy male participants – half of whom were put under acute stress – made decisions whether to exert physical effort to gain money for themselves or another person. With this design, we could independently assess the effects of acute stress on prosocial, compared to self-benefitting, effortful behaviour. Compared to controls (n = 45), participants in the stress group (n = 46) chose to exert effort more often for self- than for other-benefitting rewards at a low level of effort. Additionally, the adverse effects of stress on prosocial effort were particularly pronounced in more selfish participants. Neuroimaging combined with computational modelling revealed a putative neural mechanism underlying these effects: more stressed participants showed increased activation to subjective value in the dorsal anterior cingulate cortex and anterior insula when they themselves could benefit from their exerted effort relative to when someone else could. By using an effort-based task that better approximates real-life prosocial behaviour and incorporating trait differences in prosocial tendencies, our study provides important insights into how acute stress affects prosociality and its associated neural mechanisms.

<https://elifesciences.org/articles/87271>

**TOMMASO GHILARDI et al – Early roots of information-seeking: Infants predict and generalize the value of information**

Humans face the challenge of making sense of a complex world. Learning where to find information is crucial to filter through the abundance of stimuli, distinguish relevant from irrelevant sources, and optimize our learning. Here, we examined the developmental roots of information-seeking by testing whether 8-month-old infants can predict where to find information. We presented infants with visual cues indicating whether they will later receive information about the location of a rewarding stimulus. We analyzed the dynamics of pupil dilation when the cues were presented, but before the actual information was delivered. By combining additive Bayesian models with reinforcement learning, we show that infants learn to successfully predict what cues have a greater informational value and that they generalize these predictions to novel cues that share the same perceptual features. These results reveal the fundamental learning processes that support information-seeking from early in life.

<https://elifesciences.org/reviewed-preprints/92388>

**ESTEBAN VILLAR-RODRÍGUEZ et al – What happens to the inhibitory control functions of the right inferior frontal cortex when this area is dominant for language?**

A low number of individuals show an atypical brain control of language functions that differs from the typical lateralization in the left cerebral hemisphere. In these cases, the neural distribution of other cognitive functions is not fully understood. Although there is a bias towards a mirrored brain organization consistent with the Causal hypothesis, some individuals are found to be exceptions to this rule. However, no study has focused on what happens to the homologous language areas in the right frontal inferior cortex. Using an fMRI-adapted stop-signal task in a healthy non right-handed sample (50 typically lateralized and 36 atypically lateralized for language production), our results show that atypical lateralization is associated with a mirrored brain organization of the inhibitory control network in the left hemisphere: inferior frontal cortex, presupplementary motor area, and subthalamic nucleus. However, the individual analyses revealed a large number of cases with a noteworthy overlap in the inferior frontal gyrus, which shared both inhibitory and language functions. Further analyses showed that atypical lateralization was associated with stronger functional interhemispheric connectivity and larger corpus callosum. Importantly, we did not find task performance differences as a function of lateralization, but there was an association between atypical dominance in the inferior frontal cortex and higher scores on schizotypy and autistic spectrum traits, as well as worse performance on a reading accuracy test. Together, these results partially support the Causal hypothesis of hemispheric specialization and provide further evidence of the link between atypical hemispheric lateralization and increased interhemispheric transfer through the corpus callosum.

<https://elifesciences.org/reviewed-preprints/86797>

**MIRIAM ROMAGOSA et al – Fin whale song evolution in the North Atlantic**

Animal songs can change within and between populations as the result of different evolutionary processes. When these processes include cultural transmission, the social learning of information or behaviours from conspecifics, songs can undergo rapid evolutions because cultural novelties can emerge more frequently than genetic mutations. Understanding these song variations over large temporal and spatial scales can provide insights into the patterns, drivers and limits of song evolution that can ultimately inform on the species' capacity to adapt to rapidly changing acoustic environments. Here, we analysed changes in fin whale (*Balaenoptera physalus*) songs recorded over two decades across the central and eastern North Atlantic Ocean. We document a rapid replacement of song INIs (inter-note intervals) over just four singing seasons, that co-occurred with hybrid songs (with both INIs), and a clear geographic gradient in the occurrence of different song INIs during the transition period. We also found gradual changes in INIs and note frequencies over more than a decade with fin



whales adopting song changes. These results provide evidence of vocal learning in fin whales and reveal patterns of song evolution that raise questions on the limits of song variation in this species.

<https://elifesciences.org/articles/83750>

**POOJA DONGRE et al with ERICA VAN DE WAAL – Role of immigrant males and muzzle contacts in the uptake of a novel food by wild vervet monkeys**

The entry into and uptake of information in social groups is critical for behavioral adaptation by long-lived species in rapidly changing environments. We exposed five groups of wild vervet monkeys to a novel food to investigate the innovation of processing and consuming it. We report that immigrant males innovated in two groups, and an infant innovated in one group. In two other groups, immigrant males imported the innovation from their previous groups. We compared uptake between groups with respect to the initial innovator to examine the extent to which dispersing males could introduce an innovation into groups. Uptake of the novel food was faster in groups where immigrant males ate first rather than the infants. Younger individuals were more likely overall, and faster, to subsequently acquire the novel food. We also investigated the role of muzzle contact behavior in information seeking around the novel food. Muzzle contacts decreased in frequency over repeated exposures to the novel food. Muzzle contacts were initiated the most by naïve individuals, high rankers, and juveniles; and were targeted most towards knowledgeable individuals and high rankers, and the least towards infants. We highlight the potential importance of dispersers in rapidly exploiting novel resources among populations.

<https://elifesciences.org/articles/76486>

## Frontiers in Behavioral Neuroscience

### PAPERS

**CHEN ZHANG, MING YIN & JIXIA WU – The effect of experiences of fairness on honest behavior: a behavioral and neural study**

Prior studies have investigated the relationship between fairness and honesty. However, the differences in the focus of these studies have rendered cross-comparisons between them challenging and of limited value. Thus, this study explored how fairness impacts honest decision-making, focusing specifically on the effect of individuals' experiences of fairness on their honest behavior. Experiment 1 explored the influence of different experiences of fairness on honest behavior in an altruistic context. In Experiment 2, we measured event-related potentials to further demonstrate the brain mechanisms of these experiences on altruistic dishonest behavior. In Experiment 1, we found that the reaction time for dishonest behavior was shorter for individuals who had positive unfairness experiences with high altruistic objects compared to low altruistic objects. Individuals who had negative unfairness experiences had shorter reaction times when engaging in dishonest behaviors for the sake of high altruistic objects compared to those with equitable experiences. In Experiment 2, in which there was an opportunity to lie for a highly altruistic object, those with fair experiences had greater N2 volatility and smaller P3 volatility than those with positive unfairness experiences. These findings highlight the value of integrating moral psychology and behavioral economics. Discriminant validity across fairness experiences can help illuminate the different motivations behind moral decisions.

<https://www.frontiersin.org/articles/10.3389/fnbeh.2023.1279176/full>

## Frontiers in Integrative Neuroscience

### PAPERS

**ANGELA D. FRIEDERICI et al with ROMAN M. WITTIG, CATHERINE CROCKFORD & EBC CONSORTIUM – Brain structure and function: a multidisciplinary pipeline to study hominoid brain evolution**

To decipher the evolution of the hominoid brain and its functions, it is essential to conduct comparative studies in primates, including our closest living relatives. However, strong ethical concerns preclude in vivo neuroimaging of great apes. We propose a responsible and multidisciplinary alternative approach that links behavior to brain anatomy in non-human primates from diverse ecological backgrounds. The brains of primates observed in the wild or in captivity are extracted and fixed shortly after natural death, and then studied using advanced MRI neuroimaging and histology to reveal macro- and microstructures. By linking detailed neuroanatomy with observed behavior within and across primate species, our approach provides new perspectives on brain evolution. Combined with endocranial brain imprints extracted from computed tomographic scans of the skulls these data provide a framework for decoding evolutionary changes in hominin fossils. This approach is poised to become a key resource for investigating the evolution and functional differentiation of hominoid brains.

<https://www.frontiersin.org/articles/10.3389/fnint.2023.1299087/full>

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## Frontiers in Neuroimaging

### PAPERS

#### **TAKUTO OKUNO, NORITAKA ICHINOHE & ALEXANDER WOODWARD – A reappraisal of the default mode and frontoparietal networks in the common marmoset brain**

In recent years the common marmoset homolog of the human default mode network (DMN) has been a hot topic of discussion in the marmoset research field. Previously, the posterior cingulate cortex regions (PGM, A19M) and posterior parietal cortex regions (LIP, MIP) were defined as the DMN, but some studies claim that these form the frontoparietal network (FPN). We restarted from a neuroanatomical point of view and identified two DMN candidates: Comp-A (which has been called both the DMN and FPN) and Comp-B. We performed GLM analysis on auditory task-fMRI and found Comp-B to be more appropriate as the DMN, and Comp-A as the FPN. Additionally, through fingerprint analysis, a DMN and FPN in the tasking human was closer to the resting common marmoset. The human DMN appears to have an advanced function that may be underdeveloped in the common marmoset brain.

<https://www.frontiersin.org/articles/10.3389/fnimg.2023.1345643/full>

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## Frontiers in Neuroscience

### PAPERS

#### **SHWETA SONI et al – Intracranial recordings reveal high-frequency activity in the human temporal-parietal cortex supporting non-literal language processing**

Non-literal expressions such as sarcasm, metaphor and simile refer to words and sentences that convey meanings or intentions that are different and more abstract than literal expressions. Neuroimaging studies have shown activations in a variety of frontal, parietal and temporal brain regions implicated in non-literal language processing. However, neurophysiological correlates of these brain areas underlying non-literal processing remain underexplored.

To address this, we investigated patterns of intracranial EEG activity during non-literal processing by leveraging a unique patient population. Seven neurosurgical patients with invasive electrophysiological monitoring of superficial brain activity were recruited. Intracranial neural responses were recorded over the temporal-parietal junction (TPJ) and its surrounding areas while patients performed a language task. Participants listened to vignettes that ended with non-literal or literal statements and were then asked related questions to which they responded verbally.

We found differential neurophysiological activity during the processing of non-literal statements as compared to literal statements, especially in low-Gamma (30–70 Hz) and delta (1–4 Hz) bands. In addition, we found that neural responses related to non-literal processing in the high-gamma band (>70 Hz) were significantly more prominent at TPJ electrodes as compared to non-TPJ (i.e., control) electrodes in most subjects. Moreover, in half of patients, high-gamma activity related to non-literal processing was accompanied by delta-band modulation.

These results suggest that both low- and high-frequency electrophysiological activities in the temporal-parietal junction play a crucial role during non-literal language processing in the human brain. The current investigation, utilizing better spatial and temporal resolution of human intracranial electrocorticography, provides a unique opportunity to gain insights into the localized brain dynamics of the TPJ during the processing of non-literal language expressions.

<https://www.frontiersin.org/articles/10.3389/fnins.2023.1304031/full>

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## Frontiers in Pediatrics

### PAPERS

#### **AMANDA SAKSIDA et al – The timeline of non-vocal and vocal communicative skills in infants with hearing loss**

The study investigates what is the link between early verbal and non-vocal abilities, when does predominantly verbal communicative style occur after the intervention with cochlear implants (CI) or hearing aids (HA), and how predictive it is of later linguistic development in deaf and hard of hearing (DHH) infants and children. Cohort: children with moderate-to-profound hearing impairment (N = 49, 20 girls, mean age at HA or CI intervention = 15 months, range: 4–35 months).

Receptive and productive vocabulary at 24 and 36 months and video analysis at 12 months post-intervention. Analysis: Predictive values of total and verbal responses to communicative turns for later vocabulary development were assessed, as well as the relative time course of the development of vocal/verbal communication in DHH children.

Vocabulary at 24 months is predicted by auditory responses at 12 months, as well as by overall responsiveness before intervention. Non-vocal responses decline and overall verbal responses increase significantly between 6 and 12 months after intervention. The trend is delayed in children with delayed (>12 months of age) treatment with CI or HA.

Age of intervention affects the development of vocal/verbal communicative style. Language development, in particular, vocabulary growth, can be further stimulated by the enhancement of preverbal (both vocal and non-vocal) communicative skills.

<https://www.frontiersin.org/articles/10.3389/fped.2023.1209754/full>

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**Frontiers in Psychology****PAPERS****JIEYU LV et al – Watching eyes effect: the impact of imagined eyes on prosocial behavior and satisfactions in the dictator game**

The concept of the watching eyes effect suggests that the presence of eye or eye-like cues can influence individual altruistic behavior. However, few studies have investigated the effects of imagined eyes on altruistic behaviors and the psychological measures of dictators and recipients in the dictator game. This study used a 2 (Presentation Mode: Imagined/Visual) × 2 (Cue Type: Eye/Flower) between-subject design and measured the effects of recipients' psychological variables and the communication texts between the dictator and the recipient. The results showed that there was a significant interaction between Presentation Mode and Cue Type. In the imagined condition, the dictator exhibited more altruistic behavior than in the visual condition. However, there was no significant difference in altruistic behavior between the Imagined Eye and Imagined Flower conditions. In addition, the study found that the Cue Type had a significant main effect on the recipients' satisfaction with the allocation outcome. Notably, in the Visual Flower condition, the dictator used more egoistic norm words when communicating with the recipient than other conditions. This study provides novel evidence on the effect of imagined social cues on individual behavior in the dictator game, and to some extent validates the robustness of the watching eyes effect under manipulation of higher-level verbal cognitive processes. At the same time, the study is the first to explore the impacts on recipients' psychological variables and the communication texts. These efforts offer new insights into the psychological and cognitive mechanisms underlying the watching eyes effect.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1292232/full>

**LULU CHENG et al – An empirical study on the development of metaphorical comprehension of Chinese children**

Metaphor affects how people focus, remember, and process information and significantly influences children's language development. The study explored metaphorical comprehension by Chinese children of different ages (5–8 years). We collected response times and accuracy rates when they processed metaphorical and literal sentences with the graded saliency. Linear mixed-effects modeling showed that Chinese children's metaphorical ability improved with age. Subsequent analysis found that the perception period of metaphorical knowledge was at age 5, the development stage of metaphorical knowledge was at age 6 and 7, and the rational decision period of metaphorical ability was at age 8. After 8-year-old, children can invoke the knowledge of the intention schema while activating the source domain, and this knowledge can be automatically and quickly mapped to the target domain. Meanwhile, language development and cognitive processing influenced the metaphorical comprehension of Chinese children, especially children of 8 years of age who had the highest correct rate and the shortest reaction time to process low-saliency metaphorical sentences, while 5-year-old children had the highest accuracy in high-saliency metaphorical sentence and 6-year-old children got the longest reaction time to process sentence in high-saliency metaphor. This study may provide evidence for improving and training metaphor comprehension in children with special needs such as those with an autism spectrum disorder.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1254129/full>

**HANNA LINDFORS et al – Semantic processing of verbal narratives compared to semantic processing of visual narratives: an ERP study of school-aged children**

There is a misconception that pictures are easy to comprehend, which is problematic in pedagogical practices that include pictures. For example, if a child has difficulties with verbal narration to picture sequences, it may be interpreted as specific to spoken language even though the child may have additional difficulties with comprehension of visual narratives in the form of picture sequences. The purpose of the present study was therefore to increase our understanding of semantic processing in the pictorial domain in relation to semantic processing in the verbal domain, focusing on 9–13 years-old children with typical language development. To this end, we measured electrical brain responses (event related potentials, ERPs) in 17 children to (i) pictures (panels) that were predicted versus unpredicted in sequences of panels that conveyed visual narratives and (ii) words that were predicted versus unpredicted in sentences that conveyed verbal narratives. Results demonstrated similarities as there were no significant difference in the magnitude of the N400 effect across domains. The only difference between domains was the predicted difference in distribution, that is, a more posterior N400 effect in the verbal domain than in the pictorial domain. The study contributes to an increased understanding of the complexity of processing of visual narratives and its shared features with processing of verbal narratives, which should be considered in pedagogical practices.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1253509/full>

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**iScience****PAPERS****DEBOTTAM BHATTACHARJEE et al – Behavioral, physiological, and genetic drivers of coping in a non-human primate**

Animals experience stressful situations, from predation to social conflicts, but mostly deal with them successfully. This adaptive mechanism, coping, reduces the adverse effects of stressors, and its failure may result in reduced fitness. Substantial inter-individual variation in coping is observed, yet little is known about how behavioral, physiological and genetic

drivers regulate coping holistically and contribute to such variations. We assessed behavioral coping styles (n=30), emotional arousal (n=12), and personalities (n=32) of long-tailed macaques (*Macaca fascicularis*) and also investigated the association of coping with a Valine/Methionine polymorphism encoded by a critical human stress regulatory gene, Catechol-O-methyltransferase (COMT) (n=26). Personality and the human equivalent COMT Val158Met polymorphism were associated with 'nonaggression-based' and 'aggression-based' coping styles. Compared to nonaggression-based, aggression-based copers maintained higher average facial temperatures, indicating potentially lower emotional arousal, as measured using infrared thermography. These findings demonstrate a complex interplay of various proximate mechanisms governing coping in a non-human primate.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)00111-1](https://www.cell.com/iscience/fulltext/S2589-0042(24)00111-1)

### **ROSA RUGANI et al – Magnitude shifts spatial attention from left to right in rhesus monkeys as in the human mental number line**

Humans typically represent numbers and quantities along a left-to-right continuum. Early perspectives attributed number-space association to culture, however recent evidence in newborns and animals challenges this hypothesis.

We investigate whether the length of an array of dots influences spatial bias in rhesus macaques. We designed a touch-screen task that required monkeys to remember the location of a target. At test, monkeys maintained high performance with arrays of 2, 4, 6 or 10 dots, regardless of changes in the array's location, spacing and length. Monkeys remembered better left targets with 2-dot arrays and right targets with 6- or 10-dot arrays. Replacing the 10-dot array with a long bar, yielded more accurate performance with rightward locations, consistent with an underlying left-to-right oriented magnitude code. Our study supports the hypothesis of a spatially oriented mental magnitude line common to humans and animals, countering the idea that this code arises from uniquely-human cultural learning.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)00087-7](https://www.cell.com/iscience/fulltext/S2589-0042(24)00087-7)

### **TOM LENAERTS et al – Evolution of a Theory of Mind**

Even though Theory of Mind in upper primates has been under investigation for decades, how it may evolve remains an open problem. We propose here an evolutionary game theoretical model where a finite population of individuals may use reasoning strategies to infer a response to the anticipated behaviour of others within the context of a sequential dilemma, i.e., the centipede game. We show that strategies with bounded reasoning evolve and flourish under natural selection, provided they are allowed to make reasoning mistakes and a temptation for higher future gains is in place. We further show that non-deterministic reasoning co-evolves with an optimism bias that may lead to the selection of new equilibria, closely associated with average behaviour observed in experimental data. This work reveals both a novel perspective on the evolution of bounded rationality and a co-evolutionary link between the evolution of ToM and the emergence of misbeliefs.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)00083-X](https://www.cell.com/iscience/fulltext/S2589-0042(24)00083-X)

## Mind & Language

### PAPERS

#### **KEVIN J. LANDE – Pictorial syntax**

It is commonly assumed that images, whether in the world or in the head, do not have a privileged analysis into constituent parts. They are thought to lack the sort of syntactic structure necessary for representing complex contents and entering into sophisticated patterns of inference. I reject this assumption. "Image grammars" are models in computer vision that articulate systematic principles governing the form and content of images. These models are empirically credible and can be construed as literal grammars for images. Images can have rich syntactic structure, though of a markedly different form than sentences in language.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12497>

#### **KRISTIN ANDREWS – "All animals are conscious": Shifting the null hypothesis in consciousness science**

The marker approach is taken as best practice for answering the distribution question: Which animals are conscious? However, the methodology can be used to increase confidence in animals many presume to be unconscious, including *C. elegans*, leading to a trilemma: accept the worms as conscious; reject the specific markers; or reject the marker methodology for answering the distribution question. I defend the third option and argue that answering the distribution question requires a secure theory of consciousness. Accepting the hypothesis all animals are conscious will promote research leading to secure theory, which is needed to create reliable consciousness tests for animals and AIs. Rather than asking the distribution question, we should shift to the dimensions question: How are animals conscious?

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12498>

## Nature

### NEWS

#### **Why did the world's biggest ape go extinct?**

The 300-kilogram primate couldn't adapt when a changing environment forced a dietary shift.

<https://www.nature.com/articles/d41586-024-00033-8>

## PAPERS

### **YINGQI ZHANG et al – The demise of the giant ape *Gigantopithecus blacki***

The largest ever primate and one of the largest of the southeast Asian megafauna, *Gigantopithecus blacki*<sup>1</sup>, persisted in China from about 2.0 million years until the late middle Pleistocene when it became extinct<sup>2,3,4</sup>. Its demise is enigmatic considering that it was one of the few Asian great apes to go extinct in the last 2.6 million years, whereas others, including orangutan, survived until the present<sup>5</sup>. The cause of the disappearance of *G. blacki* remains unresolved but could shed light on primate resilience and the fate of megafauna in this region<sup>6</sup>. Here we applied three multidisciplinary analyses—timing, past environments and behaviour—to 22 caves in southern China. We used 157 radiometric ages from six dating techniques to establish a timeline for the demise of *G. blacki*. We show that from 2.3 million years ago the environment was a mosaic of forests and grasses, providing ideal conditions for thriving *G. blacki* populations. However, just before and during the extinction window between 295,000 and 215,000 years ago there was enhanced environmental variability from increased seasonality, which caused changes in plant communities and an increase in open forest environments. Although its close relative *Pongo weidenreichi* managed to adapt its dietary preferences and behaviour to this variability, *G. blacki* showed signs of chronic stress and dwindling populations. Ultimately its struggle to adapt led to the extinction of the greatest primate to ever inhabit the Earth.

<https://www.nature.com/articles/s41586-023-06900-0>

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## Nature Ecology & Evolution

### ARTICLES

#### **LUÍSEACH NIC EOIN – An older Oldowan**

The Oldowan stone tool industry, which is among the earliest documented archaeological technologies, has long been associated with the genus *Homo*. Despite being named for its first discovery at Olduvai (or Oldupai) Gorge in Tanzania, the Oldowan has been found across the eastern African rift valley as early as 2.6 million years ago (Ma) in Ethiopia, and later spread to northern and southern Africa and Eurasia. Writing in *Science* in February 2023, Plummer and colleagues challenged all of this by reporting the discovery of 3.032–2.595-million-year-old Oldowan technology at Nyayanga, Kenya at sites associated with *Paranthropus* rather than *Homo*.

<https://www.nature.com/articles/s41559-023-02285-5>

### CORRECTIONS

#### **IRIT ZOHAR et al – Author Correction: Evidence for the cooking of fish 780,000 years ago at Geshar Benot Ya'aqov, Israel**

Correction to: *Nature Ecology & Evolution* <https://doi.org/10.1038/s41559-022-01910-z>, published online 14 November 2022.

In the version of the article initially published, there was an error in the “Author contributions” section, which has now been updated in the HTML and PDF versions to read “I.Z., N.G.-I. and N.A.-A. conceived the main conceptual ideas. I.Z. and M.P. performed the identification and analyses of GBY fish remains. I.Z. and J.N. designed and performed the XRD lab experiment, analyzed and interpreted the data. I.Z. and I.H. conducted the Micro CT scans, analyzed and interpreted the data. G.S.-V. and T.T. performed the stable isotope analysis, the isotope data evaluation and interpretation. N.A.-A. performed the spatial analyses. All authors discussed the results and contributed to the final version of the manuscript.”

[Original paper listed in EAORC Bulletin 1,014, 20 November 2022.]

<https://www.nature.com/articles/s41559-023-02270-y>

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## Nature Human Behaviour

### PAPERS

#### **DANILA MEDVEDEV et al – The motivating effect of monetary over psychological incentives is stronger in WEIRD cultures**

Motivating effortful behaviour is a problem employers, governments and nonprofits face globally. However, most studies on motivation are done in Western, educated, industrialized, rich and democratic (WEIRD) cultures. We compared how hard people in six countries worked in response to monetary incentives versus psychological motivators, such as competing with or helping others. The advantage money had over psychological interventions was larger in the United States and the United Kingdom than in China, India, Mexico and South Africa (N = 8,133). In our last study, we randomly assigned cultural frames through language in bilingual Facebook users in India (N = 2,065). Money increased effort over a psychological treatment by 27% in Hindi and 52% in English. These findings contradict the standard economic intuition that people from poorer countries should be more driven by money. Instead, they suggest that the market mentality of exchanging time and effort for material benefits is most prominent in WEIRD cultures.

<https://www.nature.com/articles/s41562-023-01769-5>



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**CORRECTIONS****KENNY R. COVENTRY et al – Author Correction: Spatial communication systems across languages reflect universal action constraints**

In the version of the article initially published, in Table 1, “Bulgarian” previously read “Bulgaria”, and “Bulgaria” previously read “Eurasia”. These errors have been corrected in the HTML and PDF versions of the article.

*{Evidence, if ever it were needed, that too many cooks may indeed spoil the broth. Did everyone expect that someone else would closely read the pre-publication edit?}*

<https://www.nature.com/articles/s41562-023-01806-3>

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**Nature Humanities & Social Sciences Communications****PAPERS****HAI LAN et al – Abstract or concrete? The effects of language style and service context on continuous usage intention for AI voice assistants**

The unprecedented growth in voice assistants (VAs) provided with artificial intelligence (AI) challenges managers aiming to harness various new technologies to enhance the competitiveness of their products. This article thus investigates how VAs can more effectively improve the user experience by focusing on the attributes of service contexts, matching a utilitarian-dominant (hedonic-dominant) context with concrete (abstract) language in VA–human interactions. Through such matching, VA companies can potentially create a beneficial congruity effect, leading to more favorable evaluations. The results of three studies therefore suggest that users prefer VAs with abstract language in a hedonic-dominant service context, but that VAs with concrete language are more competitive in a utilitarian-dominant service context. Furthermore, the perception of processing fluency mediates this effect. Accordingly, these findings provide a better understanding of AI–human interactions and open a straightforward path for managers or technology providers to enhance users’ continuous usage intention.

<https://www.nature.com/articles/s41599-024-02600-w>

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**Nature Neuroscience****PAPERS****TIMOTHY H. MULLER et al – Distributional reinforcement learning in prefrontal cortex**

The prefrontal cortex is crucial for learning and decision-making. Classic reinforcement learning (RL) theories center on learning the expectation of potential rewarding outcomes and explain a wealth of neural data in the prefrontal cortex. Distributional RL, on the other hand, learns the full distribution of rewarding outcomes and better explains dopamine responses. In the present study, we show that distributional RL also better explains macaque anterior cingulate cortex neuronal responses, suggesting that it is a common mechanism for reward-guided learning.

<https://www.nature.com/articles/s41593-023-01535-w>

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**Nature Physics****PAPERS****JIANXI GAO – Intrinsic simplicity of complex systems**

Predicting the large-scale behaviour of complex systems is challenging because of their underlying nonlinear dynamics. Theoretical evidence now verifies that many complex systems can be simplified and still provide an insightful description of the phenomena of interest.

<https://www.nature.com/articles/s41567-023-02268-0>

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**Nature Reviews Physics****PAPERS****ORIOLE ARTIME et al – Robustness and resilience of complex networks**

Complex networks are ubiquitous: a cell, the human brain, a group of people and the Internet are all examples of interconnected many-body systems characterized by macroscopic properties that cannot be trivially deduced from those of their microscopic constituents. Such systems are exposed to both internal, localized, failures and external disturbances or perturbations. Owing to their interconnected structure, complex systems might be severely degraded, to the point of disintegration or systemic dysfunction. Examples include cascading failures, triggered by an initially localized overload in power systems, and the critical slowing downs of ecosystems which can be driven towards extinction. In recent years, this general phenomenon has been investigated by framing localized and systemic failures in terms of perturbations that can alter the function of a system. We capitalize on this mathematical framework to review theoretical and computational approaches to characterize robustness and resilience of complex networks. We discuss recent approaches to mitigate the impact of perturbations in terms of designing robustness, identifying early-warning signals and adapting responses. In terms of applications, we compare the performance of the state-of-the-art dismantling techniques, highlighting their optimal range of applicability for practical problems, and provide a repository with ready-to-use scripts, a much-needed tool set.

<https://www.nature.com/articles/s42254-023-00676-y>

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## Nature Scientific Reports

### PAPERS

#### **LUCA PEDRUZZI et al – The sound of yawns makes geladas yawn**

Yawning is undeniably contagious and hard to resist. Interestingly, in our species, even the mere sound of a yawn can trigger this contagious response, especially when the yawner is someone familiar. Together with humans, one other mammal species is known to produce loud and distinct vocalisations while yawning, *Theropithecus gelada*. Geladas are known for their complex social interactions and rich vocal communication, making them intriguing subjects for studying yawning behaviour. To explore the contagious effect of yawn sounds on geladas, we conducted playback experiments in a zoo-housed colony with animals living in two groups. We exposed them to yawn sounds (Test) or affiliative grunts (Control) produced by males from either their own group or the other one. The results were remarkable, as simply hearing yawn sounds led to yawn contagion in geladas, with multiple responses observed when the yawns came from members of their own group. This finding adds a significant contribution to the research on mimicry and behavioural contagion in primates. Moreover, it raises intriguing questions about the involvement of sensory modalities beyond visual perception in these phenomena.

<https://www.nature.com/articles/s41598-023-49797-5>

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## New Scientist

### NEWS

#### **Why huge ape Gigantopithecus went extinct up to 295,000 years ago**

The mysterious giant ape *Gigantopithecus blacki* died out up to 295,000 years ago, after failing to adapt to a changing climate and the food variability that went with it.

<https://www.newscientist.com/article/2411478-why-huge-ape-gigantopithecus-went-extinct-up-to-295000-years-ago/>

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## PeerJ

### PAPERS

#### **KE ZHANG et al – Space-time mapping relationships in sensorimotor communication during asymmetric joint action**

Sensorimotor communication is frequently observed in complex joint actions and social interactions. However, it remains challenging to explore the cognitive foundations behind sensorimotor communication.

The present study extends previous research by introducing a single-person baseline condition and formulates two distinct categories of asymmetric joint action tasks: distance tasks and orientation tasks. This research investigates the action performance of 65 participants under various experimental conditions utilizing a 2 (cooperative intention: Coop, No-coop) × 2 (task characteristic: distance, orientation) × 4 (target: T1, T2, T3, T4) repeated-measures experimental design to investigate the cognitive mechanisms underlying sensorimotor communication between individuals.

The results showed that (1) target key dwell time, motion time, total motion time, and maximum motion height in the Coop condition are more than in the No-coop condition. (2) In the distance task without cooperative intention, the dwell time of T4 is smaller than T1, T2, T3, and its variability of T1, T2, T3, and T4 were no different. In the distance task with cooperative intention, the dwell time and its variability of T1, T2, T3, and T4 displayed an increasing trend. (3) In the orientation task without cooperative intention, the dwell time of T1 is smaller than T2, T3, T4, and variability of the target keys T1, T2, T3, and T4 had no difference. In the orientation task with cooperative intention, the dwell time and variability of the target keys T1, T2, T3, and T4 had increasing trends.

Those findings underscore the importance of cooperative intention for sensorimotor communication. In the distance task with cooperative intention, message senders establish a mapping relationship characterized by “near-small, far-large” between the task distance and the individual’s action characteristics through sensorimotor experience. In the orientation task with cooperative intention, message senders combined sensorimotor experience and verbal metaphors to establish a mapping relationship between task orientation and action characteristics, following the sequence of “left-up, right-up, left-down, right-down” to transmit the message to others.

<https://peerj.com/articles/16764/>

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## Proceedings of the Royal Society B

### PAPERS

#### **ROBERT W. SCHUSTER, ANDREW G. CRESSWELL & LUKE A. KELLY – Human foot form and function: variable and versatile, yet sufficiently related to predict function from form**

The human foot is a complex structure that plays an important role in our capacity for upright locomotion. Comparisons of our feet with those of our closest extinct and extant relatives have linked shape features (e.g. the longitudinal and transverse arches, heel size and toe length) to specific mechanical functions. However, foot shape varies widely across the human population, so it remains unclear if and how specific shape variants are related to locomotor mechanics. Here we constructed a statistical shape–function model (SFM) from 100 healthy participants to directly explore the relationship between the shape and function of our feet. We also examined if we could predict the joint motion and moments occurring within a

person's foot during locomotion based purely on shape features. The SFM revealed that the longitudinal and transverse arches, relative foot proportions and toe shape along with their associated joint mechanics were most variable. However, each of these only accounted for small proportions of the overall variation in shape, deformation and joint mechanics, most likely owing to the high structural complexity of the foot. Nevertheless, a leave-one-out analysis showed that the SFM can accurately predict joint mechanics of a novel foot, based on its shape and deformation.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.2543>

## Royal Society Open Science

### PAPERS

#### **MATHIAS VAN DER BIEST et al – Instructing somebody else to act: motor co-representations in the instructor**

Instructions enable humans to perform novel tasks quickly. This is achieved by creating and activating the instruction representation for upcoming tasks, which can then modulate ongoing task behaviour in an almost 'reflexive' manner, an effect called instruction-based reflexivity. While most research has focused on understanding how verbal instructions are represented within the 'instructed' (i.e. the person receiving instructions), here we focus on how the instructor's (i.e. the person giving instructions) behaviour is affected through instructing. In a series of three experiments and one pooled analysis, we extended the classical instruction-based reflexivity paradigm to a novel social variant in which the instructions are given by an instructor (rather than visual computer-generated instructions). We found an instruction-based reflexivity effect for the instructor, that is, the instructor's task performance was better on congruent compared to incongruent trials (i.e. Experiments 1 and 2, pooled analysis). This suggests that the instructor represents the instructions of the instructed in an action-oriented format. However, this did not depend on the specific task of the instructed (i.e. Experiment 1), nor is it exclusively social (i.e. Experiment 3).

<https://royalsocietypublishing.org/doi/10.1098/rsos.230839>

#### **HAL WHITEHEAD – Sperm whale clans and human societies**

Sperm whale society is structured into clans that are primarily distinguished by vocal dialects, which may be symbolic markers of clan identity. However, clans also differ in non-vocal behaviour. These distinctive behaviours, as well as clan membership itself, are learned socially, largely within matrilineal lines. The clans can contain thousands of whales and span thousands of kilometres. Two or more clans typically use an area, but the whales only socialize with members of their own clan. In many respects the closest parallel may be the ethno-linguistic groups of humans. Patterns and processes of human prehistory that may be instructive in studying sperm whale clans include: the extreme variability of human societies; no clear link between modes of resource acquisition and social structure; that patterns of vocalizations may not map well onto other behavioural distinctions; and that interacting societies may deliberately distinguish their behaviour (schismogenesis). Conversely, while the two species and their societies are very different, the existence of very large-scale social structures in both sperm whales and humans supports some primary drivers of the phenomenon that are common to both species (such as cognition, cooperation, culture and mobility) and contraindicates others (e.g. tool-making and syntactic language).

<https://royalsocietypublishing.org/doi/10.1098/rsos.231353>

#### **KILLIAN MARTIN et al – Vocal complexity in a socially complex corvid: gradation, diversity and lack of common call repertoire in male rooks**

Vocal communication is widespread in animals, with vocal repertoires of varying complexity. The social complexity hypothesis predicts that species may need high vocal complexity to deal with complex social organization (e.g. have a variety of different interindividual relations). We quantified the vocal complexity of two geographically distant captive colonies of rooks, a corvid species with complex social organization and cognitive performances, but understudied vocal abilities. We quantified the diversity and gradation of their repertoire, as well as the inter-individual similarity at the vocal unit level. We found that males produced call units with lower diversity and gradation than females, while song units did not differ between sexes. Surprisingly, while females produced highly similar call repertoires, even between colonies, each individual male produced almost completely different call repertoires from any other individual. These findings question the way male rooks communicate with their social partners. We suggest that each male may actively seek to remain vocally distinct, which could be an asset in their frequently changing social environment. We conclude that inter-individual similarity, an understudied aspect of vocal repertoires, should also be considered as a measure of vocal complexity.

<https://royalsocietypublishing.org/doi/10.1098/rsos.231713>

## Science

### NEWS

#### **You may have a higher risk of MS and other diseases if you're descended from these ancient people**

"Tour de force" ancient DNA study ties disease risk, physical traits in modern Europeans to Bronze Age herders.

<https://www.science.org/content/article/you-may-have-higher-risk-ms-and-other-diseases-if-you-re-descended-these-ancient-people>

## Science Advances

### PAPERS

#### **HANEUL JANG et al – Women’s subsistence networks scaffold cultural transmission among BaYaka foragers in the Congo Basin**

In hunter-gatherer societies, women’s subsistence activities are crucial for food provisioning and children’s social learning but are understudied relative to men’s activities. To understand the structure of women’s foraging networks, we present 230 days of focal-follow data in a BaYaka community. To analyze these data, we develop a stochastic blockmodel for repeat observations with uneven sampling. We find that women’s subsistence networks are characterized by cooperation between kin, gender homophily, and mixed age-group composition. During early childhood, individuals preferentially coforage with adult kin, but those in middle childhood and adolescence are likely to coforage with nonkin peers, providing opportunities for horizontal learning. By quantifying the probability of coforaging ties across age classes and relatedness levels, our findings provide insights into the scope for social learning during women’s subsistence activities in a real-world foraging population and provide ground-truth values for key parameters used in formal models of cumulative culture.

<https://www.science.org/doi/10.1126/sciadv.adj2543>

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## Trends in Cognitive Sciences

### PAPERS

#### **ANDREA I. LUPPI et al – Information decomposition and the informational architecture of the brain**

To explain how the brain orchestrates information-processing for cognition, we must understand information itself. Importantly, information is not a monolithic entity. Information decomposition techniques provide a way to split information into its constituent elements: unique, redundant, and synergistic information. We review how disentangling synergistic and redundant interactions is redefining our understanding of integrative brain function and its neural organisation. To explain how the brain navigates the trade-offs between redundancy and synergy, we review converging evidence integrating the structural, molecular, and functional underpinnings of synergy and redundancy; their roles in cognition and computation; and how they might arise over evolution and development. Overall, disentangling synergistic and redundant information provides a guiding principle for understanding the informational architecture of the brain and cognition.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00284-X](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00284-X)

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