

## EAORC BULLETIN 1,048 – 16 July 2023

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## NOTICES

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### 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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## NEWS

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### FACEBOOK – Homo Naledi and the Many Questions Surrounding Rising Star!

Hour-long podcast with Lee Berger & Seth Chagi.

<https://fb.watch/lIRMyOoBD/>

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### JOHN TEMPLETON FOUNDATION – What Is It Like to Be an Electron?

Podcast Q&A with philosopher Philip Goff, Interview conducted by Thomas Burnett.

<https://www.templeton.org/news/what-is-it-like-to-be-an-electron>

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### NATURE BRIEFING – Oldest genetic data from a human relative

The oldest genetic data of a relative of humans have been extracted from two-million-year-old teeth of the ancient hominin species *Paranthropus robustus*. The genetic data come from protein sequences rather than DNA, which tends to be less resilient. The researchers identified the sex of the hominins that the teeth belonged to, and confirmed that *Homo sapiens*, Neanderthals and Denisovans are all more closely related to one another than they are to the *Paranthropus*. The jury is still out on whether ancient proteins will help bring consensus to the picture of hominin evolution, which is currently built largely from the shapes of bones.

Reference: bioRxiv preprint (not peer reviewed)

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=966ee96daf&e=1db4b9a19b>

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### NATURE BRIEFING – The mystery of brain-wave synchrony

The experience of being ‘on the same wavelength’ as another person is real. When people interact socially — by chatting, learning together or concocting a collaborative story — their brain waves synchronize: neurons in corresponding locations in the different brains fire at the same time. Although much about the phenomenon remains mysterious, scientists suspect that it is more than the result of two people seeing or hearing the same thing. “When we’re talking to each other, we kind of create a single überbrain that isn’t reducible to the sum of its parts,” says neuroscientist Thalia Wheatley. This could explain why social isolation is so harmful to physical and mental health.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=24b016242f&e=1db4b9a19b>

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### NATURE BRIEFING – Giant-sloth art hints at human migration

What seem to be beautifully carved and polished pendants made from the bony plates of giant sloths (*Glossotherium phoenesis*) suggest that people lived alongside the huge mammals. That means humans made it to South America earlier than thought — some 27,000 years ago. “We now have good evidence — together with other sites from South and North America — that we have to rethink our ideas about the migration of humans to the Americas,” says archaeologist and study co-author Mirian Liza Alves Forancelli Pacheco.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=d60dbe1892&e=1db4b9a19b>

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### NATURE BRIEFING – Birds build nests from anti-bird spikes

Crows and magpies are building nests with the metal spikes meant to deter them from perching or nesting. Carrion crows (*Corvus corone*) and Eurasian magpies (*Pica pica*) in The Netherlands, Belgium and Scotland were observed to have plucked the sharp metal pins off buildings to use in their nests. The magpies even put most of the spikes on top of their nests, perhaps in an anti-bird effort of their own (crows eat magpies’ eggs).

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=18b45af568&e=1db4b9a19b>

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### SAPIENS – Why I Ask My Students to Swear in Class

An anthropologist uses explicit insults to get students thinking about gender and power in everyday language. Plus, a brief explainer on the slang term “sus.”

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<https://www.sapiens.org/language/gendered-insults/>

## SAPIENS – The Oldest True Stories in the World

Evidence gathered in recent years shows that some ancient narratives contain remarkably reliable records of real events.

<https://www.sapiens.org/language/oral-tradition/>

## THE CONVERSATION – Male rhesus macaques often have sex with each other

Most of the males in a Puerto Rican monkey colony engaged in homosexual activity, a new study reveals.

<https://theconversationuk.cmail20.com/t/r-l-ttdtlyjy-khhlliliah-v/>

## THE CONVERSATION – Want to collaborate better? Pick your partner wisely and learn how to read them

'Mind-reading' requires the ability to put yourself in someone else's shoes, predicting their actions and reading their emotions.

<https://theconversationuk.cmail19.com/t/r-l-ttdtitl-khhlliliah-yd/>

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## PUBLICATIONS

### American Journal of Biological Anthropology

#### PAPERS

#### **NATALIA MAYA LASTRA, ARIADNA RANGEL NEGRÍN & PEDRO A. D. DIAS – Behavioral responses of mantled howler monkeys to neighbor long-distance vocalizations**

Long-distance vocalizations are used by primates in a variety of contexts and may have different functions. The long-distance vocalizations of howler monkeys (*Alouatta* spp.) underlie the spatial regulation of neighboring groups and could be associated with the defense of food resources. Here, we test the hypothesis that the behavioral responses of mantled howler monkeys (*A. palliata*) to neighbor long-distance vocalizations are influenced by the potential for range defensibility while accounting for location within the home range and food availability.

We studied two groups for 13 months and a total of 888 h at La Flor de Catemaco (Mexico). Group 1 had a 92-ha home range and Group 2 had a 24-ha home range. We recorded vocalizations (N = 178 calls) and movements (N = 74 movements) of focal groups following long-distance vocalizations produced by their neighbors.

Movement responses, but not vocal responses, were predicted by range defensibility, location, and food availability. As predicted, the group living in the smaller and more defensible range showed stronger movement responses than the group in the larger home range. These movement responses had a shorter latency and longer duration in more valuable spatial and temporal contexts (i.e., the core area and during periods of low food availability).

These results suggest that the tradeoff between the costs and benefits of range defense varies according to the interactions between home range size and both the spatial (core areas) and temporal (food availability) abundance of resources. Thus, the responses of mantled howler monkeys to neighbor long-distance vocalizations could be related to home range defensibility.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24810>

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### Animal Behaviour

#### PAPERS

#### **FRANCESCA DE PETRILLO et al – Do tufted capuchin monkeys, *Sapajus* spp., experience regret in decision making under risk?**

We assessed capuchins' behavioural responses in a risky choice task.

Unfavourable outcomes elicited more switching (disappointment-like behaviour).

More switching was seen when the alternative was better (regret-like behaviour).

Males showed more switching attempts than females.

Risky choices increased after showing disappointment- and regret-like behaviours.

<https://www.sciencedirect.com/science/article/pii/S0003347223001410>

#### **JACOB D. NEGREY, TOBIAS DESCHNER & KEVIN E. LANGERGRABER – Lean muscle mass, not aggression, mediates a link between dominance rank and testosterone in wild male chimpanzees**

Testosterone promotes mating effort, which involves intraspecific aggression for males of many species. Therefore, males with higher testosterone levels are often thought to be more aggressive. For mammals living in multimale groups, aggression is hypothesized to link male social status (i.e. dominance rank) and testosterone levels, given that high status predicts mating success and is acquired partly through aggressive intragroup competition. In male chimpanzees, *Pan troglodytes*, dominance rank has been repeatedly linked to interindividual variation in testosterone levels, but evidence directly linking interindividual variation in testosterone and aggression is lacking. In the present study, we test both aggression levels and lean muscle mass, as measured by urinary creatinine, as links between dominance rank and testosterone levels in a large sample of wild male

chimpanzees. Multivariate analyses indicated that dominance rank was positively associated with total rates of intragroup aggression, average urinary testosterone levels and average urinary creatinine levels. Testosterone was positively associated with creatinine levels but negatively associated with total aggression rates. Furthermore, mediation analyses showed that testosterone levels facilitated an association between dominance rank and creatinine levels. Our results indicate that (1) adult male chimpanzees with higher average testosterone levels are often higher ranking but not more aggressive than males with lower testosterone and (2) lean muscle mass links dominance rank and testosterone levels in Ngogo males. We assert that aggression rates are insufficient to explain links between dominance rank and testosterone levels in male chimpanzees and that other social variables (e.g. male–male relationship quality) may regulate testosterone's links to aggression.

<https://www.sciencedirect.com/science/article/abs/pii/S0003347223001550>

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## Cell Genomics

### ARTICLES

#### **EVAN E. EICHLER – Sampling a wide swathe of primate genetic diversity**

Two studies published in *Science* report the deepest survey of primate genetic diversity using short-read sequencing to sample ~47% of extant species. Kuderna et al. investigate genetic diversity, mutation rates, and our primate phylogeny, while Gao et al. use the data to better classify disease-causing mutations.

[https://www.cell.com/cell-genomics/fulltext/S2666-979X\(23\)00141-6](https://www.cell.com/cell-genomics/fulltext/S2666-979X(23)00141-6)

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## Current Biology

### ARTICLES

#### **MICHAEL GROSS – A tree full of primate genomes**

The genomes of primates, the order comprising humans as well as apes, monkeys and lemurs, had only been studied selectively so far. The Primate Genomes Project has now delivered a major release of genomic data yielding new insights into the evolution, speciation, hybridisation, and adaptation of primates, with important implications ranging from conservation concerns to human health.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)00828-X](https://www.cell.com/current-biology/fulltext/S0960-9822(23)00828-X)

### PAPERS

#### **LAUREN M. BENEDICT et al – Food-caching mountain chickadees can learn abstract rules to solve a complex spatial-temporal pattern**

The use of abstract rules in behavioral decisions is considered evidence of executive functions associated with higher-level cognition. Laboratory studies across taxa have shown that animals may be capable of learning abstract concepts, such as the relationships between items, but often use simpler cognitive abilities to solve tasks. Little is known about whether or how animals learn and use abstract rules in natural environments. Here, we tested whether wild, food-caching mountain chickadees (*Poecile gambeli*) could learn an abstract rule in a spatial-temporal task in which the location of a food reward rotated daily around an 8-feeder square spatial array for up to 34 days. Chickadees initially searched for the daily food reward by visiting the most recently rewarding locations and then moving backward to visit previously rewarding feeders, using memory of previous locations. But by the end of the task, chickadees were more likely to search forward in the correct direction of rotation, moving away from the previously rewarding feeders. These results suggest that chickadees learned the direction rule for daily feeder rotation and used this to guide their decisions while searching for a food reward. Thus, chickadees appear to use an executive function to make decisions on a foraging-based task in the wild.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)00821-7](https://www.cell.com/current-biology/fulltext/S0960-9822(23)00821-7)

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## eLife

### PAPERS

#### **FILIZ TEZCAN, HUGO WEISSBART & ANDREA E MARTIN – A tradeoff between acoustic and linguistic feature encoding in spoken language comprehension**

When we comprehend language from speech, the phase of the neural response aligns with particular features of the speech input, resulting in a phenomenon referred to as neural tracking. In recent years, a large body of work has demonstrated the tracking of the acoustic envelope and abstract linguistic units at the phoneme and word levels, and beyond. However, the degree to which speech tracking is driven by acoustic edges of the signal, or by internally-generated linguistic units, or by the interplay of both, remains contentious. In this study, we used naturalistic story-listening to investigate (1) whether phoneme-level features are tracked over and above acoustic edges, (2) whether word entropy, which can reflect sentence- and discourse-level constraints, impacted the encoding of acoustic and phoneme-level features, and (3) whether the tracking of acoustic edges was enhanced or suppressed during comprehension of a first language (Dutch) compared to a statistically familiar but uncomprehended language (French). We first show that encoding models with phoneme-level linguistic features, in addition to acoustic features, uncovered an increased neural tracking response; this signal was further amplified in a comprehended language, putatively reflecting the transformation of acoustic features into internally generated phoneme-level representations. Phonemes were tracked more strongly in a comprehended language, suggesting that language

comprehension functions as a neural filter over acoustic edges of the speech signal as it transforms sensory signals into abstract linguistic units. We then show that word entropy enhances neural tracking of both acoustic and phonemic features when sentence- and discourse-context are less constraining. When language was not comprehended, acoustic features, but not phonemic ones, were more strongly modulated, but in contrast, when a native language is comprehended, phoneme features are more strongly modulated. Taken together, our findings highlight the flexible modulation of acoustic, and phonemic features by sentence and discourse-level constraint in language comprehension, and document the neural transformation from speech perception to language comprehension, consistent with an account of language processing as a neural filter from sensory to abstract representations.

<https://elifesciences.org/articles/82386>

#### **ADRIANO R. LAMEIRA et al – Recursive self-embedded vocal motifs in wild orangutans**

Recursive procedures that allow placing a vocal signal inside another of similar kind provide a neuro-computational blueprint for syntax and phonology in spoken language and human song. There are, however, no known vocal patterns among nonhuman primates arranged in self-embedded combinations that evince vocal recursion or potential insipient forms and neuro-procedures thereof, suggesting a neuro-cognitive transformation exclusive to humans. Here, we uncover that wild flanged male orangutan long calls show two hierarchical strata, wherein rhythmically isochronous call sequences are nested within self-similar isochronous call sequences. Remarkably, three unrelated recursive motifs occurred simultaneously in long calls, refuting that motifs resulted from three parallel linear procedures or that motifs were simple anatomical artifacts of bodily constrains. Findings represent a case of recursive hominid vocal production in the absence syntax, semantics, phonology or music. Second-order combinatorics, ‘sequences within sequences’, involving hierarchically organized and cyclically structured vocal sounds in ancient hominids may have precluded the evolution of recursion in modern language-able humans.

<https://elifesciences.org/reviewed-preprints/88348>

#### **SOPHIE BAVARD & STEFANO PALMINTERI – The functional form of value normalization in human reinforcement learning**

Reinforcement learning research in humans and other species indicates that rewards are represented in a context-dependent manner. More specifically, reward representations seem to be normalized as a function of the value of the alternative options. The dominant view postulates that value context-dependence is achieved via a divisive normalization rule, inspired by perceptual decision-making research. However, behavioral and neural evidence points to another plausible mechanism: range normalization. Critically, previous experimental designs were ill-suited to disentangle the divisive and the range normalization accounts, which generate similar behavioral predictions in many circumstances. To address this question, we designed a new learning task where we manipulated, across learning contexts, the number of options and the value ranges. Behavioral and computational analyses falsify the divisive normalization account and rather provide support for the range normalization rule. Together, these results shed new light on the computational mechanisms underlying context-dependence in learning and decision-making.

<https://elifesciences.org/articles/83891>

#### **LEE R. BERGER et mul with AGUSTÍN FUENTES – Evidence for deliberate burial of the dead by Homo naledi**

Recent excavations in the Rising Star Cave System of South Africa have revealed burials of the extinct hominin species *Homo naledi*. A combination of geological and anatomical evidence shows that hominins dug holes that disrupted the subsurface stratigraphy and interred the remains of *H. naledi* individuals, resulting in at least two discrete features within the Dinaledi Chamber and the Hill Antechamber. These are the most ancient interments yet recorded in the hominin record, earlier than evidence of *Homo sapiens* interments by at least 100,000 years. These interments along with other evidence suggest that diverse mortuary practices may have been conducted by *H. naledi* within the cave system. These discoveries show that mortuary practices were not limited to *H. sapiens* or other hominins with large brain sizes.

<https://elifesciences.org/reviewed-preprints/89106>

#### **LEE R. BERGER et al with AGUSTÍN FUENTES – 241,000 to 335,000 Years Old Rock Engravings Made by Homo naledi in the Rising Star Cave system, South Africa**

The production of painted, etched or engraved designs on cave walls or other surfaces is recognized as a major cognitive step in human evolution. Such intentional designs, which are widely interpreted as signifying, recording, and transmitting information in a durable manner were once considered exclusive to Late Pleistocene *Homo sapiens*. Recent work has demonstrated that other hominin groups also made such marks, including Neanderthals (Rodríguez-Vidal et al., 2014; Hoffmann et al., 2018), and possibly Middle-Pleistocene *Homo erectus* (Joordens et al., 2015). Such durable signs indicate an intentionality characteristic of meaning-making (Kissel and Fuentes 2018) which has been argued to require significant levels of cognitive abilities not found in species with smaller brain sizes (Parkington, 2010). In fact, the evolution of such meaning-making symbols is thought to be a core aspect of what it means to be “human” (Henshilwood, 2009). Here we present the first known example of abstract patterns and shapes engraved within the Dinaledi subsystem of the Rising Star Cave in South Africa. We identified markings incised into the dolomitic limestone walls of the cave. The engravings described here are

deeply impressed cross-hatchings and other geometric shapes. The surfaces bearing these engravings appear to have been prepared and smoothed. In some areas there is residue that creates a sheen on the surface possibly indicating repeated handling or rubbing of the rock, and there is evidence of the application of dirt or sand to the surface by non-natural processes. *Homo naledi* entered this part of the cave system and buried bodies within the both the Dinaledi Chamber and adjacent Hill Antechamber between 241 and 335 ka (Dirks et al., 2017; Robbins et al., 2021, Berger et al, 2023a). The engravings described here are found on a pillar in the Hill Antechamber that extends into the natural fissure corridor that links the two chambers and we associate them with *H. naledi*.

<https://elifesciences.org/reviewed-preprints/89102>

**AGUSTÍN FUENTES et al with LEE R. BERGER – Burials and engravings in a small-brained hominin, *Homo naledi*, from the late Pleistocene: contexts and evolutionary implications**

Data from recent explorations in the Dinaledi subsystem illustrates one of the earliest examples of a mortuary practice in hominins and offers the earliest evidence of multiple interments and funerary actions, as well as evidence of the early creation of meaning making by a hominin. The hominin undertaking these behaviors was the small-brained *Homo naledi*. These data call into question several key assumptions about behavioral and cognitive evolution in Pleistocene hominins. The evidence from Dinaledi push back the temporal origins of mortuary and funerary behaviors and associate the creation of meaning making with a small-brained species and thus challenge key assumptions about the role and importance of encephalization in human evolution. This suggests that the hominin socio-cognitive niche and its relation to meaning-making activities is more diverse than previously thought. The association of these activities in subterranean spaces accessed and modified by the small brained species *Homo naledi* impacts assertions that technological and cognitive advances in human evolution are associated solely with the evolution of larger brains.

<https://elifesciences.org/reviewed-preprints/89125>

## Frontiers in Psychology

### PAPERS

**KATRINE FALCON SØBY, BYURAKN ISHKHANYAN & LINE BURHOLT KRISTENSEN – Not all grammar errors are equally noticed: error detection of naturally occurring errors and implications for eye-tracking models of everyday texts**

Grammar errors are a natural part of everyday written communication. They are not a uniform group, but vary from morphological errors to ungrammatical word order and involve different types of word classes. In this study, we examine whether some types of naturally occurring errors attract more attention than others during reading, measured by detection rates. Data from 211 Danish high school students were included in the analysis. They each read texts containing different types of errors: syntactic errors (verb-third word order), morphological agreement errors (verb conjugations; gender mismatches in NPs) and orthographic errors. Participants were asked to underline all errors they detected while reading for comprehension. We examined whether there was a link between the type of errors that participants did not detect, the type of errors which they produce themselves (as measured in a subsequent grammar quiz), and the type of errors that are typical of high school students in general (based on error rates in a corpus). If an error is infrequent in production, it may cause a larger surprisal effect and be more attended to. For the three subtypes of grammar errors (V3 word order, verb errors, NP errors), corpus error rates predicted detection rates for most conditions. Yet, frequency was not the only possible explanation, as phonological similarity to the correct form is entangled with error frequency. Explicit grammatical awareness also played a role. The more correct answers participants had in the grammar tasks in the quiz, the more errors they detected. Finally, we found that the more annoyed with language errors participants reported to be, the more errors they detected. Our study did not measure eye movements, but the differences in error detection patterns point to shortcomings of existing eye-tracking models. Understanding the factors that govern attention and reaction to everyday grammar errors is crucial to developing robust eye-tracking processing models which can accommodate non-standard variation. Based on our results, we give our recommendations for current and future processing models.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1124227/full>

## Mind & Language

### PAPERS

**LAURA BICKEL – Why the performance of habit requires attention**

This article argues that every performance of habit-driven action requires attention. I begin by revisiting the conception of habit-driven actions as reducible to automatically performed responses to stimuli. On this conception, habitual actions are a counterexample to Wayne Wu's action-centered theory of attention. Using the biased competition model of attention, and building on findings from affective cognitive neuroscience, I challenge this position. I claim that the performance of a habitual action requires experiential history to be exerting an influence that is best understood as implicit selection-biasing. It follows from this that habit-driven action is compatible with Wu's theory.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12467>

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**Nature****NEWS****Oldest genetic data from a human relative found in 2-million-year-old teeth**

Ancient protein sequences identify the sex of *Paranthropus robustus* fossils and hint at evolutionary relationships.

<https://www.nature.com/articles/d41586-023-02242-z>

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**Nature Communications****PAPERS****TOE AUNG et al – Group size and mating system predict sex differences in vocal fundamental frequency in anthropoid primates**

Vocalizations differ substantially between the sexes in many primates, and low-frequency male vocalizations may be favored by sexual selection because they intimidate rivals and/or attract mates. Sexual dimorphism in fundamental frequency may be more pronounced in species with more intense male mating competition and in those with large group size, where social knowledge is limited and efficient judgment of potential mates and competitors is crucial. These non-mutually exclusive explanations have not been tested simultaneously across primate species. In a sample of vocalizations ( $n = 1914$  recordings) across 37 anthropoid species, we investigated whether fundamental frequency dimorphism evolved in association with increased intensity of mating competition (H1), large group size (H2), multilevel social organization (H3), a trade-off against the intensity of sperm competition (H4), and/or poor acoustic habitats (H5), controlling for phylogeny and body size dimorphism. We show that fundamental frequency dimorphism increased in evolutionary transitions towards larger group size and polygyny. Findings suggest that low-frequency male vocalizations in primates may have been driven by selection to win mating opportunities by avoiding costly fights and may be more important in larger groups, where limited social knowledge affords advantages to rapid assessment of status and threat potential via conspicuous secondary sexual characteristics.

<https://www.nature.com/articles/s41467-023-39535-w>

**NACE MIKUS et al – Blocking D2/D3 dopamine receptors in male participants increases volatility of beliefs when learning to trust others**

The ability to learn about other people is crucial for human social functioning. Dopamine has been proposed to regulate the precision of beliefs, but direct behavioural evidence of this is lacking. In this study, we investigate how a high dose of the D2/D3 dopamine receptor antagonist sulpiride impacts learning about other people's prosocial attitudes in a repeated Trust game. Using a Bayesian model of belief updating, we show that in a sample of 76 male participants sulpiride increases the volatility of beliefs, which leads to higher precision weights on prediction errors. This effect is driven by participants with genetically conferred higher dopamine availability (Taq1a polymorphism) and remains even after controlling for working memory performance. Higher precision weights are reflected in higher reciprocal behaviour in the repeated Trust game but not in single-round Trust games. Our data provide evidence that the D2 receptors are pivotal in regulating prediction error-driven belief updating in a social context.

<https://www.nature.com/articles/s41467-023-39823-5>

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**Nature Ecology & Evolution****ARTICLES****ELEANOR M. L. SCERRI – One species, many roots?**

A new genetic study provides strong support for the view that our species evolved from exchanges between several ancestral populations in different African regions.

<https://www.nature.com/articles/s41559-023-02080-2>

**PAPERS****KHADY NIANG et al – Longstanding behavioural stability in West Africa extends to the Middle Pleistocene at Bargny, coastal Senegal**

Middle Stone Age (MSA) technologies first appear in the archaeological records of northern, eastern and southern Africa during the Middle Pleistocene epoch. The absence of MSA sites from West Africa limits evaluation of shared behaviours across the continent during the late Middle Pleistocene and the diversity of subsequent regionalized trajectories. Here we present evidence for the late Middle Pleistocene MSA occupation of the West African littoral at Bargny, Senegal, dating to 150 thousand years ago. Palaeoecological evidence suggests that Bargny was a hydrological refugium during the MSA occupation, supporting estuarine conditions during Middle Pleistocene arid phases. The stone tool technology at Bargny presents characteristics widely shared across Africa in the late Middle Pleistocene but which remain uniquely stable in West Africa to the onset of the Holocene. We explore how the persistent habitability of West African environments, including mangroves, contributes to distinctly West African trajectories of behavioural stability.

<https://www.nature.com/articles/s41559-023-02046-4>

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**JACKSON CLIVE, EWAN FLINTHAM & VINCENT SAVOLAINEN – Same-sex sociosexual behaviour is widespread and heritable in male rhesus macaques**

Numerous reports have documented the occurrence of same-sex sociosexual behaviour (SSB) across animal species. However, the distribution of the behaviour within a species needs to be studied to test hypotheses describing its evolution and maintenance, in particular whether the behaviour is heritable and can therefore evolve by natural selection. Here we collected detailed observations across 3 yr of social and mounting behaviour of 236 male semi-wild rhesus macaques, which we combined with a pedigree dating back to 1938, to show that SSB is both repeatable (19.35%) and heritable (6.4%). Demographic factors (age and group structure) explained SSB variation only marginally. Furthermore, we found a positive genetic correlation between same-sex mounter and mountee activities, indicating a common basis to different forms of SSB. Finally, we found no evidence of fitness costs to SSB, but show instead that the behaviour mediated coalitionary partnerships that have been linked to improved reproductive success. Together, our results demonstrate that SSB is frequent in rhesus macaques, can evolve, and is not costly, indicating that SSB may be a common feature of primate reproductive ecology.

<https://www.nature.com/articles/s41559-023-02111-y>

**OBITUARIES****DARRELL J. KEMP et al – John Alcock (1943–2023)**

On the 15 January 2023 the world of animal behaviour and evolutionary biology lost a measure of its shine with the passing of John Alcock. John's name and influence will be familiar to many in the field from his undergraduate textbook, *Animal Behaviour: An Evolutionary Approach* (1975). Many others have been inspired directly by John's teachings, public talks or scientific lectures, or have enjoyed any of his more than 200 scientific papers and 12 books. Still others — like ourselves — have enjoyed the gift of John's company or even been fortunate enough to join one of his field excursions in the south-west USA or Australia. Entire generations of animal behaviourists and behavioural ecologists have been touched in some way by his rich contribution to these fields. Following a battle with neurodegenerative illness, John sadly passed away near his home in Tempe, Arizona, and in the shadow of his beloved Sonoran Desert mountaintops.

<https://www.nature.com/articles/s41559-023-02073-1>

**Nature Human Behaviour****ARTICLES****ABUBAKARI AHMED et al – The future of academic publishing**

Academic publishing is the backbone of science dissemination — but is the current system fit for purpose? We asked a diverse group of scientists to comment on the future of publishing. They discuss systemic issues, challenges, and opportunities, and share their vision for the future.

<https://www.nature.com/articles/s41562-023-01637-2>

**New Scientist****NEWS****Sex between two males is extremely common in wild macaque monkeys**

Almost three-quarters of male macaques observed by scientists mounted other males, and the behaviour may help to strengthen alliances.

<https://www.newscientist.com/article/2381784-sex-between-two-males-is-extremely-common-in-wild-macaque-monkeys/>

**Crows can understand probability like primates do**

When given the chance to peck on symbols that carried different probabilities of getting food, carrion crows learned to choose the one with a higher probability of reward.

<https://www.newscientist.com/article/2381335-crows-can-understand-probability-like-primates-do/>

**English industrialist stole iron technique from Black metallurgists**

A process for converting scrap metal into high-quality iron, which was crucial to the Industrial Revolution, was devised by Black metallurgists who were enslaved and transported to Jamaica by the British.

<https://www.newscientist.com/article/2380941-english-industrialist-stole-iron-technique-from-black-metallurgists/>

**Ancient Scandinavians wrote encrypted messages in runes 1500 years ago**

Objects from Norway and Sweden, some dating from AD 500 to 700, show clear evidence of encryption using runic symbols, the alphabet later used by the Vikings.

<https://www.newscientist.com/article/2381177-ancient-scandinavians-wrote-encrypted-messages-in-runes-1500-years-ago/>

**Tooth analysis reveals ancient Iberian leader was female**

Molecular evidence has revealed that a person buried with lavish goods over 4000 years ago was female, not male as previously thought.

<https://www.newscientist.com/article/2381355-tooth-analysis-reveals-ancient-iberian-leader-was-female/>

## ARTICLES

### **COLIN BARRAS – Life's hidden laws: The arcane rules of evolution and how they work**

A handful of “rules” govern how evolution shapes life on Earth, from island gigantism to colours shifting with latitude – and offer clues about how animals and plants might adapt to a warming world

<https://www.newscientist.com/article/mg25934470-200-lifes-hidden-laws-the-arcane-rules-of-evolution-and-how-they-work/>

## PeerJ

### PAPERS

### **MARIO DALMASO, GIACOMO FEDRIGO & MICHELE VICOVARO – Gazing left, gazing right: exploring a spatial bias in social attention**

Faces oriented rightwards are sometimes perceived as more dominant than faces oriented leftwards. In this study, we explored whether faces oriented rightwards can also elicit increased attentional orienting. Participants completed a discrimination task in which they were asked to discriminate, by means of a keypress, a peripheral target. At the same time, a task-irrelevant face oriented leftwards or rightwards appeared at the centre of the screen. The results showed that, while for faces oriented rightwards targets appearing on the right were responded to faster as compared to targets appearing on the left, for faces oriented leftwards no differences emerged between left and right targets. Furthermore, we also found a negative correlation between the magnitude of the orienting response elicited by the faces oriented leftwards and the level of conservatism of the participants. Overall, these findings provide evidence for the existence of a spatial bias reflected in social orienting.

<https://peerj.com/articles/15694/>

## Philosophical Transactions of the Royal Society B

### PAPERS

### **TOPI K. LEHTONEN et al – The role of cognition in nesting**

For many animals, nests are essential for reproductive success. Nesting individuals need to carry out a range of potentially challenging tasks, from selecting an appropriate site and choosing suitable materials to constructing the nest and defending it against competitors, parasites and predators. Given the high fitness stakes involved, and the diverse impacts both the abiotic and social environment can have on nesting success, we might expect cognition to facilitate nesting efforts. This should be especially true under variable environmental conditions, including those changing due to anthropogenic impacts. Here, we review, across a wide range of taxa, evidence linking cognition to nesting behaviours, including selection of nesting sites and materials, nest construction, and nest defence. We also discuss how different cognitive abilities may increase an individual's nesting success. Finally, we highlight how combining experimental and comparative research can uncover the links between cognitive abilities, nesting behaviours and the evolutionary pathways that may have led to the associations between them. In so doing, the review highlights current knowledge gaps and provides suggestions for future research.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2022.0142>

### **D. CHARLES DEEMING – Nest construction in mammals: a review of the patterns of construction and functional roles**

Nesting behaviour in mammals has been investigated in a wide variety of species but to date there has not been any scholarly review of the incidence and roles of these nests. Not all mammals build nests but, while some large species regularly build nests, nest-building behaviour is more commonly associated with small mammals weighing less than a kilogram. Quantitative data for the amounts of different materials used in a nest are rarely reported but mammal nests are typically constructed from fresh (rather than dead) plant materials. Animal-derived materials seem to be rare in nests, but anthropogenic materials are reported. Few studies have examined the roles these different materials play but more physically robust materials provide support for the structure. Many mammal nests have maternity roles, but a variety of other roles were recognized. A wide range of mammalian orders use nests for resting and environmental protection. Less common roles were as sites for torpor or hibernation, or as a refuge from predation, or the materials may have anti-parasite properties. These different roles were often not mutually exclusive. It is hoped that this review will stimulate interest in the functional properties of mammalian nests. It also suggests various themes that would be interesting areas for future research.

<https://royalsocietypublishing.org/doi/10.1098/rstb.2022.0138>

## PNAS

### PAPERS

### **MARTIN GIURFA et al – An insect brain organizes numbers on a left-to-right mental number line**

The ability to judge numbers exists in various vertebrate species but also in honey bees, thus raising the question of the phylogenetic origins of numerosity systems. Here, we studied if bees, like humans, organize numbers spatially from left to

right according to their magnitude. As the cultural vs. biological origins of this mental number line (MNL) are a subject of debate, our study provides an important perspective for this discussion. We show that bees order numbers from left to right according to their magnitude and that the location of a number on that line varies with the reference number previously trained. Thus, the MNL is a biological numeric representation that is common to the nervous system with distant evolutionary origins.

<https://www.pnas.org/doi/full/10.1073/pnas.2203584119>

## COMMENTARIES

### **BENJAMIN PITT, DANIEL CASASANTO & STEVEN T. PIANTADOSI – No clear evidence for an innate left-to-right mental number line**

In their paper, Giurfa, Marcout, Hilpert, Thevenot, & Rugani seek to clarify the origins of spatial–numerical associations in a study of honeybees. Like studies of other animals and human neonates, this study shows a robust behavioral asymmetry: rightward movement in response to more numerous dot arrays and leftward movement in response to less numerous arrays. These results are provocative, but there are reasons to doubt that humans or animals have an innate left-to-right mental number line.

<https://www.pnas.org/doi/full/10.1073/pnas.2306099120>

### **MARTIN GIURFA, CATHERINE THEVENOT & ROSA RUGANI – Reply to Pitt et al.: Evidence from bees is consistent with a biological origin of a left-to-right mental number line**

Pitt et al. criticized the interpretation of our work showing that bees order numerosity from left to right according to their magnitude. In doing so, they reiterated that spatial–numerical associations have a cultural rather than a biological basis. As similar findings have been already documented in other animals and newborns without culture (e.g., refs. 3, 4–7), using the bee case to refuel this debate represents a setback, particularly when experimental procedures are misunderstood and the organization of insect brains ignored.

<https://www.pnas.org/doi/full/10.1073/pnas.2306470120>

## Proceedings of the Royal Society B

### PAPERS

### **REBECCA F. B. PADGET, TIM W. FAWCETT & SAFI K. DARDEN – Guppies in large groups cooperate more frequently in an experimental test of the group size paradox**

The volunteer's dilemma, in which a single individual is required to produce a public good, predicts that individuals in larger groups will cooperate less frequently. Mechanistically, this could result from trade-offs between costs associated with volunteering and costs incurred if the public good is not produced (nobody volunteers). During predator inspection, one major contributor to the cost of volunteering is likely increased probability of predation; however, a predator also poses a risk to all individuals if nobody inspects. We tested the prediction that guppies in larger groups will inspect a predator less than those in smaller groups. We also predicted that individuals in larger groups would perceive less threat from the predator stimulus because of the protective benefits of larger groups (e.g. dilution). Contrary to prediction, we found that individuals in large groups inspected more frequently than those in smaller groups, but (as predicted) spent less time in refuges. There was evidence that individuals in intermediate-sized groups made fewest inspections and spent most time in refuges, suggesting that any link between group size, risk and cooperation is not driven by simple dilution. Extensions of theoretical models that capture these dynamics will likely be broadly applicable to risky cooperative behaviour.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2023.0790>

### **STEFAN BODE et al – When knowledge hurts: humans are willing to receive pain for obtaining non-instrumental information**

Humans and other animals value information that reduces uncertainty or leads to pleasurable anticipation, even if it cannot be used to gain tangible rewards or change outcomes. In exchange, they are willing to incur significant costs, sacrifice rewards or invest effort. We investigated whether human participants were also willing to endure pain—a highly salient and aversive cost—to obtain such information. Forty participants performed a computer-based task. On each trial, they observed a coin flip, with each side associated with different monetary rewards of varying magnitude. Participants could choose to endure a painful stimulus (low, moderate or high pain) to learn the outcome of the coin flip immediately. Importantly, regardless of their choice, winnings were always earned, rendering this information non-instrumental. Results showed that agents were willing to endure pain in exchange for information, with a lower likelihood of doing so as pain levels increased. Both higher average rewards and a larger variance between the two possible rewards independently increased the willingness to accept pain. Our results show that the intrinsic value of escaping uncertainty through non-instrumental information is sufficient to offset pain experiences, suggesting a shared mechanism through which these can be directly compared.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2023.1175>

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**THAIS R. PANSANI et al – Evidence of artefacts made of giant sloth bones in central Brazil around the last glacial maximum**

The peopling of the Americas and human interaction with the Pleistocene megafauna in South America remain hotly debated. The Santa Elina rock shelter in Central Brazil shows evidence of successive human settlements from around the last glacial maximum (LGM) to the Early Holocene. Two Pleistocene archaeological layers include rich lithic industry associated with remains of the extinct giant ground sloth *Glossotherium phoenesis*. The remains include thousands of osteoderms (i.e. dermal bones), three of which were human-modified. In this study, we perform a traceological analysis of these artefacts by optical microscopy, non-destructive scanning electron microscopy, UV/visible photoluminescence and synchrotron-based microtomography. We also describe the spatial association between the giant sloth bone remains and stone tools and provide a Bayesian age model that confirms the timing of this association in two time horizons of the Pleistocene in Santa Elina. The conclusion from our traceological study is that the three giant sloth osteoderms were intentionally modified into artefacts before fossilization of the bones. This provides additional evidence for the contemporaneity of humans and megafauna, and for the human manufacturing of personal artefacts on bone remains of ground sloths, around the LGM in Central Brazil.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.0316>

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**Science****NEWS****Fake scientific papers are alarmingly common**

But new tools show promise in tackling growing symptom of academia's "publish or perish" culture.

<https://www.science.org/content/article/fake-scientific-papers-are-alarmingly-common>

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**ARTICLES****CHRISTIAN RUTZ et al – Using machine learning to decode animal communication**

New methods promise transformative insights and conservation benefits.

<https://www.science.org/doi/10.1126/science.adg7314>

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**Science Advances****PAPERS****CLAUDIA FICHEL, JOHANNA HENKE-VON DER MALSBURG & PETER M. KAPPELER – Cognitive performance is linked to fitness in a wild primate**

Cognitive performance varies widely across animal species, but the processes underlying cognitive evolution remain poorly known. For cognitive abilities to evolve, performance must be linked to individual fitness benefits, but these links have been rarely studied in primates even though they exceed most other mammals in these traits. We subjected 198 wild gray mouse lemurs to four cognitive and two personality tests and subsequently monitored their survival in a mark-recapture study. Our study revealed that survival was predicted by individual variation in cognitive performance as well as body mass and exploration. Because cognitive performance covaried negatively with exploration, individuals gathering more accurate information enjoyed better cognitive performance and lived longer, but so did heavier and more explorative individuals. These effects may reflect a speed-accuracy trade-off, with alternative strategies yielding similar overall fitness. The observed intraspecific variation in selective benefits of cognitive performance, if heritable, can provide the basis for the evolution of cognitive abilities in members of our lineage.

<https://www.science.org/doi/full/10.1126/sciadv.adf9365>

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