

## EAORC BULLETIN 1,109 – 15 September 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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## NEWS

### JOHN TEMPLETON FOUNDATION – What’s the Word?

Gossip arrived in the English language through natural childbirth. With a title combining the roots for God and sibling, a gossip was a child’s baptismal sponsor, often one of the women from a community who would gather to assist a mother in childbirth and, incidentally, share pertinent news. Gossip became a verb via Shakespeare, still in the sponsoring sense (“petty, fond adoptious christendoms / That blinking Cupid gossips”), before drifting towards its current meaning.

Etymologies aside, gossip in its present sense seems to have always been with us, and despite various moral and cultural concerns with its negative aspects, it can be argued gossiping is part of what makes us human.

<https://www.templeton.org/news/whats-the-word>

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### NATURE BRIEFING – Peer reviewers might be ‘gaming the system’

An analysis of peer reviews published by some journals alongside their papers has highlighted a scheme that might allow reviewers to benefit from duplicated or generic reviews. The analysis identified 263 suspicious reviews published by 37 journals between 2021 and 2024. Marketing researcher María Ángeles Oviedo-García, the author of the study, suspects that reviewers are using templates to quickly churn out reviews and boost their own professional standing, or in some cases receive credit toward future publishing fees. “Some other researchers will probably base their future research on those fake-reviewed papers, and it’s scary,” she says.

<https://www.science.org/content/article/suspicious-phrases-peer-reviews-point-referees-gaming-system>

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### **NATURE BRIEFING – ‘Self-medicating’ gorillas in Gabon**

Researchers kept track of which plants a group of western lowland gorillas (*Gorilla gorilla gorilla*) were eating. Working with local healers, they found that four of these plants had medicinal properties. Each of these four plants even showed activity against at least one strain of multidrug-resistant *E. coli*.

<https://www.bbc.co.uk/news/articles/c23lj94mk93o>

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### **SAPIENS – Why AI Will Never Fully Capture Human Language**

Researchers in artificial intelligence have made extraordinary strides in mimicking human language—but they still can't capture the parts that truly make language human.

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

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### **SCIENCEADVISER – These fish size themselves up in the mirror to decide whether to brawl**

Bluestreak cleaner wrasse are famously smart, even outperforming chimpanzees on some tests. Five years ago, they passed the “mirror test”—a cognitive challenge that aims to determine if an animal recognizes its reflection—and just last year, follow-up research found they can spot pictures of themselves. Now, a study suggests that the animals ‘check themselves out’ before deciding whether to attack another fish.

<https://www.nature.com/articles/s41598-024-70138-7>

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### **SCIENCE DAILY – Agriculture accelerated human genome evolution to capture energy from starchy foods**

Scientists have suspected that modern humans have more genes to digest starch than our hunter-gatherer ancestors, but the amylase locus of the genome is hard to study. Researchers have now developed new methods to isolate the multiple amylase genes and compare the locus to ancient genomes. They found that amylase gene number has increased from an average of eight to more than 11 over the past 12,000 years.

<https://www.sciencedaily.com/releases/2024/09/240904141503.htm>

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### **SCIENCE DAILY – Morphing facial technology sheds light on the boundaries of self-recognition**

Facial recognition is a critical part of self-image and social interactions. In an era of advanced digital technology, we face intriguing questions about communication and identity. How does altering our facial identity affect our sense of ‘self’ and our interactions with others?

<https://www.sciencedaily.com/releases/2024/08/240830110924.htm>

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### **SCIENCE DAILY – Brain-wide decision-making dynamics discovered**

Neuroscientists have revealed how sensory input is transformed into motor action across multiple brain regions in mice. The research shows that decision-making is a global process across the brain that is coordinated by learning. The findings could aid artificial intelligence research by providing insights into how to design more distributed neural networks.

<https://www.sciencedaily.com/releases/2024/09/240911112023.htm>

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### **SCIENCE DAILY – Conscientiousness, not willpower, is a reliable predictor of success**

According to two psychologists, the field of psychological science has a problem with the concept of self-control. It has named self-control both a ‘trait’ -- a key facet of personality involving attributes like conscientiousness, grit and the ability to tolerate delayed gratification -- and a ‘state,’ a fleeting condition that can best be described as willpower. These two concepts are at odds with one another and are often confused, the authors report.

<https://www.sciencedaily.com/releases/2024/09/240910121026.htm>

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### **SCIENCE DAILY – Self-medicating gorillas and traditional healers provide clues for new drug discovery**

Four plants consumed by wild gorillas in Gabon and used by local communities in traditional medicine show antibacterial and antioxidant properties, researchers report.

<https://www.sciencedaily.com/releases/2024/09/240911142129.htm>

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### **SCIENCE DAILY – Mirror, mirror, in my tank, who's the biggest fish of all?**

Researchers have demonstrated that bluestreak cleaner wrasse (*Labroides dimidiatus*) checked their body size in a mirror before choosing whether to attack fish that were slightly larger or smaller than themselves, saying it was the first time for a non-human animal to be demonstrated to possess some mental states that are elements of private self-awareness.

<https://www.sciencedaily.com/releases/2024/09/24091112117.htm>

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**SCIENCE.ORG NEWS – Suspicious phrases in peer reviews point to referees gaming the system**

Hundreds of scientific papers bear signs of reviewers using templates to quickly churn out reports for personal gain.

<https://www.science.org/content/article/suspicious-phrases-peer-reviews-point-referees-gaming-system>

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**PUBLICATIONS****Animal Behaviour****PAPERS****ANDREW WHITEN – Diverse species readily acquire copies of novel actions from others that are not achieved through individual learning**

The cultural transmission of behaviour patterns across animal populations and between generations has been rigorously demonstrated in diverse vertebrate species and also in insects, but controversies continue about exactly what distinguishes nonhuman from human cultural learning. A contentious contemporary debate concerns a hypothetical ‘zone of latent solutions’ (ZLS), conceptualized as all that members of a species can acquire by individual learning. The ZLS hypothesis proposes that cumulative culture is restricted to humans because of a unique ability to copy behavioural innovations beyond our species’ ZLS. Apes and other taxa are argued instead to be limited to copying only behaviours that are already within their ZLS, thus constraining their capacity for cumulative culture. Here I suggest that empirical tests of this hypothesis are scattered through the research literature covering social learning experiments and I collate relevant instances. Over 20 such studies spanning mammals, birds, fish and insects demonstrate social learning of novel actions new to the species that no individual acquires through its own efforts. Many offer particularly compelling refutation of the ZLS hypothesis because in addition to documenting an absence of individual level learning, they incorporate designs showing that observers match whichever of two alternative forms of action they witnessed or include multistep actions that are clearly challenging for individuals of the species studied to acquire by individual learning.

<https://www.sciencedirect.com/science/article/pii/S0003347224002227>

**YONGQIANG WU et al – Low food stores affect dance communication and health-related gene expression in honey bees**

Honey bees, *Apis mellifera*, are important pollinators, and they face many natural and anthropogenic challenges that affect their ability to collect the resources needed to maintain the colony. Foragers can make use of a remarkable repertoire of communication behaviours that help colonies to exploit their environment successfully. Food source availability is a key factor for colony success and, therefore, survival and reproduction. Few studies have investigated how food stores impact forager communication strategies and bee physiology. We experimentally manipulated honey stores and (1) quantified the production and following of waggle dances, (2) quantified the expression of immune-related genes using qPCR and (3) analysed fatty acids from bee abdomens using GC-MS 6 days after the experimental manipulation. We found that the number of waggle dances increased by about 60% when honey bees were starved of honey. The number of followers per dance, however, decreased, which may be due to a switch to proactive, solitary foraging or to the occurrence of more waggle dances. Waggle dance duration, the number of waggle phase followers that were followed and foraging distances were not affected by the treatments. Bees in starved colonies showed a higher expression of the gene *defensin 1*, which is an important predictor of overwinter survival, but there was no treatment effect on fatty acid content. Our results show that the amount of honey stored in hives affects communication behaviours and the investment in immunocompetence of bees, possibly to counter the negative health effects of nutritional stress. However, fat content does not seem to be affected in the time span of the study.

<https://www.sciencedirect.com/science/article/pii/S0003347224002124>

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**Cell Genomics****PAPERS****LUDOVIC SLIMAK et al – Long genetic and social isolation in Neanderthals before their extinction**

Neanderthal genomes have been recovered from sites across Eurasia, painting an increasingly complex picture of their populations’ structure that mostly indicates that late European Neanderthals belonged to a single metapopulation with no significant evidence of population structure. Here, we report the discovery of a late Neanderthal individual, nicknamed “Thorin,” from Grotte Mandrin in Mediterranean France, and his genome. These dentognathic fossils, including a rare example of distomolars, are associated with a rich archeological record of Neanderthal final technological traditions in this region ~50–42 thousand years ago. Thorin’s genome reveals a relatively early divergence of ~105 ka with other late Neanderthals. Thorin belonged to a population with a small group size that showed no genetic introgression with other known late European Neanderthals, revealing some 50 ka of genetic isolation of his lineage despite them living in neighboring regions. These results have important implications for resolving competing hypotheses about causes of the disappearance of the Neanderthals.

[https://www.cell.com/cell-genomics/fulltext/S2666-979X\(24\)00177-0](https://www.cell.com/cell-genomics/fulltext/S2666-979X(24)00177-0)

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## eLife

## PAPERS

**KATHRYN ROGERS, JOSHUA I GOLD & LONG DING – The subthalamic nucleus contributes causally to perceptual decision-making in monkeys**

The subthalamic nucleus (STN) plays critical roles in the motor and cognitive function of the basal ganglia (BG), but the exact nature of these roles is not fully understood, especially in the context of decision-making based on uncertain evidence. Guided by theoretical predictions of specific STN contributions, we used single-unit recording and electrical microstimulation in the STN of healthy monkeys to assess its causal, computational roles in visual-saccadic decisions based on noisy evidence. The recordings identified subpopulations of STN neurons with distinct task-related activity patterns that related to different theoretically predicted functions. Microstimulation caused changes in behavioral choices and response times that reflected multiple contributions to an “accumulate-to-bound”-like decision process, including modulation of decision bounds and evidence accumulation, and to non-perceptual processes. These results provide new insights into the multiple ways that the STN can support higher brain function.

<https://elifesciences.org/reviewed-preprints/98345>

**SHIRLEY MARK et al – Flexible neural representations of abstract structural knowledge in the human Entorhinal Cortex**

Humans' ability for generalisation is outstanding. It is flexible enough to identify cases where knowledge from prior tasks is relevant, even when many features of the current task are different, such as the sensory stimuli or the size of the task state space. We have previously shown that in abstract tasks, humans can generalise knowledge in cases where the only cross-task shared feature is the statistical rules that govern the task's state-state relationships. Here, we hypothesized that this capacity is associated with generalisable representations in the entorhinal cortex (EC). This hypothesis was based on the EC's generalisable representations in spatial tasks and recent discoveries about its role in the representation of abstract tasks. We first develop an analysis method capable of testing for such representations in fMRI data, explain why other common methods would have failed for our task, and validate our method through a combination of electrophysiological data analysis, simulations and fMRI sanity checks. We then show with fMRI that EC representations generalise across complex non-spatial tasks that share a hexagonal grid structural form but differ in their size and sensory stimuli, i.e. their only shared feature is the rules governing their statistical structure. There was no clear evidence for such generalisation in EC for non-spatial tasks with clustered, as opposed to planar, structure.

<https://elifesciences.org/reviewed-preprints/101134>

**MUGE OZKER et al – Speech-induced suppression and vocal feedback sensitivity in human cortex**

Across the animal kingdom, neural responses in the auditory cortex are suppressed during vocalization, and humans are no exception. A common hypothesis is that suppression increases sensitivity to auditory feedback, enabling the detection of vocalization errors. This hypothesis has been previously confirmed in non-human primates, however a direct link between auditory suppression and sensitivity in human speech monitoring remains elusive. To address this issue, we obtained intracranial electroencephalography (iEEG) recordings from 35 neurosurgical participants during speech production. We first characterized the detailed topography of auditory suppression, which varied across superior temporal gyrus (STG). Next, we performed a delayed auditory feedback (DAF) task to determine whether the suppressed sites were also sensitive to auditory feedback alterations. Indeed, overlapping sites showed enhanced responses to feedback, indicating sensitivity. Importantly, there was a strong correlation between the degree of auditory suppression and feedback sensitivity, suggesting suppression might be a key mechanism that underlies speech monitoring. Further, we found that when participants produced speech with simultaneous auditory feedback, posterior STG was selectively activated if participants were engaged in a DAF paradigm, suggesting that increased attentional load can modulate auditory feedback sensitivity.

<https://elifesciences.org/articles/94198>

## Frontiers in Psychology

## PAPERS

**DAOKAI SUN et al – Online interpersonal trust and online altruistic behavior in college students: the chain mediating role of moral identity and online social support**

The prevalence of online altruistic behaviors among the college students has attracted widespread attention. However, the factors influencing this are still unclear. The objective of this study was to explore the relationship and mechanism of online interpersonal trust, moral identity, online social support and online altruistic behavior among college students.

The survey was conducted among 986 Chinese college students using the Interpersonal Trust Scale for the Internet, Moral Identity Scale, The Internet Social Support Questionnaire for College Students and The Internet Altruistic Behavior Questionnaire for College Students.

Online social support, online interpersonal trust and online altruistic behavior were significantly positively correlated ( $r = 0.09-0.39$ ,  $p < 0.01$ ). Online social support plays a partial mediating role in the relation between online interpersonal trust and online altruistic behavior, accounting for 33.76% of the total effect, while moral identity and online

social support play a chain mediating role in the relation between online interpersonal trust and online altruistic behavior, accounting for 2.23% of the total effect.

Online interpersonal trust not only directly affects college students' online altruistic behavior, but also indirectly influences it through moral identity and online social support.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1452066/full>

### **LIZ SMEETS – L1 grammatical attrition through the acquisition of competing L2 discourse features**

A question in language acquisition research is whether attrition can affect L1 grammatical representation, and if so, under what conditions. This paper tests the Attrition via Acquisition (AvA) model, which takes a Feature Reassembly approach to predict how, in case on high degrees of similarity between the L1 and L2, the acquisition of L2 discourse-driven morpho-syntactic properties may affect L1 feature representations after a prolonged change in the speaker's primary linguistic input during adulthood. As a test case, we use the different features (specificity versus discourse anaphoricity) associated with Clitic Left Dislocation (CLLD) in Romanian and Italian, examining the grammars of Romanian first-generation immigrants with either L2 Italian or L2 English (a language without CLLD). Using a context-dependent Acceptability Judgment task and a Written Elicitation task we found evidence for L2-induced grammatical attrition, resulting in the addition of an L2 option without the loss of an L1 option, as predicted by the AvA. Attrition was found for participants who immigrated during adolescence or early adulthood and who are more likely to consider Italian their most proficient and most used language. We compare our findings on attrited L1 grammars to the results of a recent study reporting on near-native L2 Italian and L2 Romanian grammars by Romanian and Italian native speakers. Our findings contribute to an increasing body of literature showing that L1 attriters and L2 learners can end up with very similar grammars and confirm the importance of studying second language acquisition and L1 loss within a broader picture of bilingual development.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1399870/full>

### **MARIT LOBBEN & BRUNO LAENG – Zooming in and out of semantics: proximal–distal construal levels and prominence hierarchies**

We argue that the “Prominence Hierarchy” within linguistics can be subsumed under the “Construal Level Theory” within psychology and that a wide spectrum of grammatical phenomena, ranging from case assignment to number, definiteness, verbal agreement, voice, direct/inverse morphology, and syntactic word-order respond to Prominence Hierarchies (PH), or semantic scales. In fact, the field of prominence hierarchies, as expressed through the languages of the world, continues to be riddled with riddles. We identify a set of conundrums: (A) vantage point and animacy, (B) individuation and narrow reference phenomena, (C) fronting mechanisms, (D) abstraction, and (E) cultural variance and flexibility. We here propose an account for the existence of these hierarchies and their pervasive effects on grammar by relying on psychological Construal Level Theory (CLT). We suggest that both PH and CLT structure the external world according to proximity or distance from the “Me, Here and Now” (MHN) perspective. In language, MHN has the effect of structuring grammars; in cognition, it structures our lives, our preferences, and choices.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1371538/full>

## Nature

### PAPERS

#### **J. VÍCTOR MORENO-MAYAR et al – Ancient Rapanui genomes reveal resilience and pre-European contact with the Americas**

Rapa Nui (also known as Easter Island) is one of the most isolated inhabited places in the world. It has captured the imagination of many owing to its archaeological record, which includes iconic megalithic statues called moai<sup>1</sup>. Two prominent contentions have arisen from the extensive study of Rapa Nui. First, the history of the Rapanui has been presented as a warning tale of resource overexploitation that would have culminated in a major population collapse—the ‘ecocide’ theory<sup>2,3,4</sup>. Second, the possibility of trans-Pacific voyages to the Americas pre-dating European contact is still debated<sup>5,6,7</sup>. Here, to address these questions, we reconstructed the genomic history of the Rapanui on the basis of 15 ancient Rapanui individuals that we radiocarbon dated (1670–1950 ce) and whole-genome sequenced (0.4–25.6×). We find that these individuals are Polynesian in origin and most closely related to present-day Rapanui, a finding that will contribute to repatriation efforts. Through effective population size reconstructions and extensive population genetics simulations, we reject a scenario involving a severe population bottleneck during the 1600s, as proposed by the ecocide theory. Furthermore, the ancient and present-day Rapanui carry similar proportions of Native American admixture (about 10%). Using a Bayesian approach integrating genetic and radiocarbon dates, we estimate that this admixture event occurred about 1250–1430 ce.

<https://www.nature.com/articles/s41586-024-07881-4>

## Nature Communications

### PAPERS

#### **WOLFRAM HÖPS et al – Impact and characterization of serial structural variations across humans and great apes**

Modern sequencing technology enables the systematic detection of complex structural variation (SV) across genomes. However, extensive DNA rearrangements arising through a series of mutations, a phenomenon we refer to as serial SV (sSV), remain underexplored, posing a challenge for SV discovery. Here, we present NAHRwhals (<https://github.com/WHops/NAHRwhals>), a method to infer repeat-mediated series of SVs in long-read genomic assemblies. Applying NAHRwhals to haplotype-resolved human genomes from 28 individuals reveals 37 sSV loci of various length and complexity. These sSVs explain otherwise cryptic variation in medically relevant regions such as the TPSAB1 gene, 8p23.1, 22q11 and Sotos syndrome regions. Comparisons with great ape assemblies indicate that most human sSVs formed recently, after the human-ape split, and involved non-repeat-mediated processes in addition to non-allelic homologous recombination. NAHRwhals reliably discovers and characterizes sSVs at scale and independent of species, uncovering their genomic abundance and suggesting broader implications for disease.

<https://www.nature.com/articles/s41467-024-52027-9>

#### **TOM HIGHAM et al – Chronometric data and stratigraphic evidence support discontinuity between Neanderthals and early Homo sapiens in the Italian Peninsula**

The process by which Palaeolithic Europe was transformed from a Neanderthal-dominated region to one occupied exclusively by Homo sapiens has proven challenging to diagnose. A blurred chronology has made it difficult to determine when Neanderthals disappeared and whether modern humans overlapped with them. Italy is a crucial region because here we can identify not only Late Mousterian industries, assumed to be associated with Neanderthals, but also early Upper Palaeolithic industries linked with the appearance of early H. sapiens, such as the Uluzzian and the Aurignacian. Here, we present a chronometric dataset of 105 new determinations (74 radiocarbon and 31 luminescence ages) from four key southern Italian sites: Cavallo, Castelvita, Cala, and Oscurusciuto. We built Bayesian-based chronometric models incorporating these results alongside the relative stratigraphic sequences at each site. The results suggest; 1) that the disappearance of Neanderthals probably pre-dated the appearance of early modern humans in the region and; 2) that there was a partial overlap in the chronology of the Uluzzian and Protoaurignacian, suggesting that these industries may have been produced by different human groups in Europe.

<https://www.nature.com/articles/s41467-024-51546-9>

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## Nature Communications Psychology

### NEWS

#### **Cognitive neuroscience: the brain's symphony in hearing speech and music**

New research shows that the brain employs similar anatomical regions but specific neural oscillatory patterns during speech and music perception.

<https://www.nature.com/articles/s44271-024-00136-y>

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## Nature Computational Science

### ARTICLES

#### **JIE HU – Deconstructing the compounds of altruism**

A computational model is proposed to provide a better understanding of human altruism, highlighting the role of multiple motives that influence altruistic behaviors.

<https://www.nature.com/articles/s43588-024-00690-9>

### PAPERS

#### **XIAOYAN WU et al – The motive cocktail in altruistic behaviors**

Prosocial motives such as social equality and efficiency are key to altruistic behaviors. However, predicting the range of altruistic behaviors in varying contexts and individuals proves challenging if we limit ourselves to one or two motives. Here we demonstrate the numerous, interdependent motives in altruistic behaviors and the possibility to disentangle them through behavioral experimental data and computational modeling. In one laboratory experiment (N = 157) and one preregistered online replication (N = 1,258), across 100 different situations, we found that both third-party punishment and third-party helping behaviors (that is, an unaffected individual punishes the transgressor or helps the victim) aligned best with a model of seven socioeconomic motives, referred to as a motive cocktail. For instance, the inequality discounting motives imply that individuals, when confronted with costly interventions, behave as if the inequality between others barely exists. The motive cocktail model also provides a unified explanation for the differences in intervention willingness between second parties (victims) and third parties, and between punishment and helping.

<https://www.nature.com/articles/s43588-024-00685-6>

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## Nature Reviews Earth and Environment

### PAPERS

**AXEL TIMMERMANN et al – Past climate change effects on human evolution**

The genus *Homo* evolved during the Pleistocene — an epoch of gradual cooling and amplification of glacial cycles. The changing climates influenced early human survival, adaptation and evolution in complex ways. In this Review, we present current knowledge about the effects of past climate changes on the evolutionary trajectory of human species. Humans emerged in dry grassland and shrubland when average climate conditions were warm. As global climate started cooling down, human species needed either to track their preferred habitats or to adapt to new local conditions, each of which is indicated in the archaeological record. Limited dispersal ability and narrow ecological preferences were predominant in early species, whereas cultural innovations and consequently wider ecological niches became commonplace in later species, allowing them to live in colder extratropical climates. Yet, despite their growing ecological versatility, all species but one eventually went extinct. Future research should explore cultural transmission between and within species, and the influence of climate change on human genetic diversification.

<https://www.nature.com/articles/s43017-024-00584-4>

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## Nature Scientific Reports

### PAPERS

**JENNIFER A. D. COLBOURNE, ALICE M. I. AUERSPERG & SARAH R. BECK – Children’s limited tooling ability in a novel concurrent tool use task supports the innovation gap**

School-aged children have consistently shown a surprising developmental lag when attempting to innovate solutions to tool use tasks, despite being capable of learning to solve these problems from a demonstrator. We suggest that this “innovation gap” arises from tool tasks with more complex spatial relations. Following Frigaszy and Mangalam’s new tooling theory, we predicted that innovating a new “sticker slide” task should be more challenging when two tools need to be used at the same time (concurrently) rather than one at a time (sequentially), despite the similarity of the other task elements. In line with previous work, both versions of the task were challenging for all ages of children (4–9 years) that we tested. However, the youngest group showed particularly extreme difficulties, which was marked by not a single child innovating the concurrent version. Although success significantly increased with age, even the oldest group failed to reach 50% success on the concurrent version of the task, whereas the majority of the two older groups could solve the sequential version. Thus, in this first study of concurrent tool use in children, we found support for the prediction that increasing the complexity of spatial relations in tooling exacerbates the innovation gap.

<https://www.nature.com/articles/s41598-024-71686-8>

**PIOTR FEDUREK et al – Prosocial reputation and stress among contemporary hunter-gatherers: the Hadza case**

It has been suggested that having a reputation for being prosocial is a critical part of social status across all human societies. It has also been argued that prosocial behavior confers benefits, whether physiological, such as stress reduction, or social, such as building allies or becoming more popular. Here, we investigate the relationship between helping reputation (being named as someone others would go to for help), and hair-derived chronic stress (hair cortisol concentration). In a sample of 77 women and 62 men, we found that perceived helping reputation was not related to chronic stress. Overall, the results of our study suggest that, in an egalitarian society with fluid camp membership and widely practiced generosity such as the Hadza, helping reputation does not necessarily boost stress-related health benefits through prestige-signaling mechanisms observed in hierarchical, large-scale societies.

<https://www.nature.com/articles/s41598-024-72238-w>

**JOHANNES RODRIGUES et al – The relationship of the source of punishment and personality traits with investment and punishment in a public goods game**

In this study, we investigated the motivations behind punishing individuals who exploit common resources, a phenomenon crucial for resource preservation. While some researchers suggest punishment stems from concern for the common good, others propose it is driven by anger toward free riders. To probe these motivations, we developed a modified public goods game in which participants had the option to use their own money or the money from the common pool to punish free riders. The analysis included choice behavior, mouse trajectories, and personality traits like anger, empathy, and altruism. According to our results, investments were highest, and punishment was strongest if participants could punish using credits from the common pool, indicating that this is the preferred option to diminish free riding and maintain cooperation in public goods and common good contexts. Also, punishment was highest if the punisher’s own investment was high, and the investment of others was low. Concerning traits, highly altruistic individuals tended to invest more and punish less in general but gave harsher punishments when they did choose to use the common pool punitively. Conversely, trait anger and trait empathy were linked to low investment while trait empathy also tended to be related to lower punishment. Taken together, these findings underscore the role of situational factors and personality traits in fostering cooperative behavior and shaping societal norms around costly punishment.

<https://www.nature.com/articles/s41598-024-71106-x>

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## PLoS Biology

## PAPERS

**DANIEL R. CLEARY et al – Syllable processing is organized in discrete subregions of the human superior temporal gyrus**  
*This is an uncorrected proof.*

Modular organization at approximately 1 mm scale could be fundamental to cortical processing, but its presence in human association cortex is unknown. Using custom-built, high-density electrode arrays placed on the cortical surface of 7 patients undergoing awake craniotomy for tumor excision, we investigated receptive speech processing in the left (dominant) human posterior superior temporal gyrus. Responses to consonant-vowel syllables and noise-vocoded controls recorded with 1,024 channel micro-grids at 200  $\mu\text{m}$  pitch demonstrated roughly circular domains approximately 1.7 mm in diameter, with sharp boundaries observed in 128 channel linear arrays at 50  $\mu\text{m}$  pitch, possibly consistent with a columnar organization. Peak latencies to syllables in different modules were bimodally distributed centered at 252 and 386 ms. Adjacent modules were sharply delineated from each other by their distinct time courses and stimulus selectivity. We suggest that receptive language cortex may be organized in discrete processing modules.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002774>

## PLoS One

## PAPERS

**LERESCHE EVEN DONEILLY OYABA YINDA et al – Antibacterial and antioxidant activities of plants consumed by western lowland gorilla (*Gorilla gorilla gorilla*) in Gabon**

Zoopharmacognosy is the study of the self-medication behaviors of non-human animals that use plant, animal or soil items as remedies. Recent studies have shown that some of the plants employed by animals may also be used for the same therapeutic purposes in humans. The aim of this study was to determine the antioxidant and antibacterial activity of *Ceiba pentandra*, *Myrianthus arboreus*, *Ficus* subspecies (ssp.) and *Milicia excelsa* bark crude extracts (BCE), plants consumed by western lowland gorillas (*Gorilla gorilla gorilla*) in Moukalaba-Doudou National Park (MDNP) and used in traditional medicine, and then to characterize their phytochemical compounds. DPPH (2,2-Diphenyl-1-Picrylhydrazyl), phosphomolybdenum complex and  $\beta$ -carotene bleaching methods were used to assess antioxidant activity. Antimicrobial susceptibility testing was performed using the diffusion method, while minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were assessed using the microdilution method. The highest level of total phenolics was found in *Myrianthus arboreus* aqueous extract [ $385.83 \pm 3.99$  mg gallic acid equivalent (GAE)/g]. Total flavonoid (134.46  $\pm$  3.39) mg quercetin equivalent (QE)/100 g of extract] were highest in *Milicia excelsa*, tannin [(272.44  $\pm$  3.39) mg tannic acid equivalent (TAE)/100 g of extract] in *Myrianthus arboreus* and proanthocyanidin [(404.33  $\pm$  3.39) mg apple procyanidins equivalent (APE)/100 g of extract] in *Ceiba pentandra*. *Ficus* ssp. (IC<sub>50</sub> 1.34  $\pm$  3.36  $\mu\text{g}/\text{mL}$ ; AAI 18.57  $\pm$  0.203) ethanolic BCE and *Milicia excelsa* (IC<sub>50</sub> 2.07  $\pm$  3.37  $\mu\text{g}/\text{mL}$ ; AAI 12.03  $\pm$  0.711) showed the strongest antioxidant activity. *Myrianthus arboreus* ethanolic BCE (73.25  $\pm$  5.29) and *Milicia excelsa* aqueous BCE (38.67  $\pm$  0.27) showed the strongest percentage of total antioxidant capacity (TAC). *Ceiba pentandra* ethanolic BCE (152.06  $\pm$  19.11 mg AAE/g) and *Ficus* ssp aqueous BCE (124.33  $\pm$  39.05 mg AAE/g) showed strongest relative antioxidant activity (RAA). The plant BCE showed antimicrobial activity against multidrug resistant (MDR) *E. coli* (DECs) isolates, with MICs varying from 1.56 to 50 mg/mL and inhibition diameters ranging from 7.34  $\pm$  0.57 to 13.67  $\pm$  0.57 mm. Several families of compounds were found, including total phenolic compounds, flavonoids, tannins and proanthocyanidins were found in the plant BCEs. The plant BCEs showed antioxidant activities with free radical scavenging and antimicrobial activities against 10 MDR *E. coli* (DECs) isolates, and could be a promising novel source for new drug discovery.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0306957>

## Proceedings of the Royal Society B

## PAPERS

**NELLY A. FRAGOSO VARGAS & MICHAEL A. BERTHAUME – Easy to gain but hard to lose: the evolution of the knee sesamoid bones in Primates—a systematic review and phylogenetic meta-analysis**

Sesamoids are variably present skeletal elements found in tendons and ligaments near joints. Variability in sesamoid size, location and presence/absence is hypothesized to enable skeletal innovation, yet sesamoids are often ignored. Three knee sesamoids—the cyamella, medial fabella and lateral fabella—are present in primates, but we know little about how they evolved, if they are skeletal innovations, or why they are largely missing from Hominoidea. Our phylogenetic comparative analyses suggest that sesamoid presence/absence is highly phylogenetically structured and contains phylogenetic signal. Models suggest that it is easy to gain but difficult/impossible to lose knee sesamoids and that the fabellae may have similar developmental/evolutionary pathways that are distinct from the cyamella. Sesamoid presence/absence is uncorrelated to the mode of locomotion, suggesting that sesamoid biomechanical function may require information beyond sesamoid presence, such as size and location. Ancestral state reconstructions were largely uninformative but highlighted how reconstructions using parsimony can differ from those that are phylogenetically informed. Interestingly, there may be two ways to evolve fabellae, with humans evolving fabellae differently from most other primates. We hypothesize that the 're-

emergence' of the lateral fabella in humans may be correlated with the evolution of a unique developmental pathway, potentially correlated with the evolution of straight-legged, bipedal locomotion.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2024.0774>

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## Science

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#### **JEFFREY BRAINARD – Suspicious phrases in peer reviews point to referees gaming the system**

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