EAORC BULLETIN 1,138 – 6 April 2025

CONTENTS

NOTICES

FORMATTED VERSION OF THIS BULLETIN

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

PUBLICATION ALERTS

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

EDITORIAL INTERJECTIONS

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

ACADEMIA.EDU – Mutual Enlightenment: Recent Phenomenology in Cognitive Science

Journal of Consciousness Studies 4:3, 195-214 (1997).

SHAUN GALLAGHER – Mutual Enlightenment: Recent Phenomenology in Cognitive Science

This article provides a critical review of recent work at the intersection of phenomenology and cognitive science. What is and what ought to be the relationship between these two approaches to the study of consciousness? This review explores problems involved with expressing subjective experience in an objective fashion, and issues involved in the use of principles of isomorphism to explain how brain and consciousness are interrelated. It suggests that strict lines cannot be drawn

between third-person theory and phenomenological description, that the division of labour between phenomenology and cognitive science is not very strict, and that the best model for understanding the relation between these two approaches is one that emphasizes an externalist viewpoint.
https://www.academia.edu/128616993/Mutual_Enlightenment_Recent_Phenomenology_in_Cognitive_Science

NEWS

NATURE BRIEFING – DNA profiles from people in a lush Sahara

The genomes of two women who lived 7,000 years ago in the Sahara when it was a green savannah reveal a remarkably isolated population. These represent the first full Saharan genomes from the African Humid Period — a time between 14,500 and 5,000 years ago when an unusually wet interval transformed the desert into a grassy woodland. The genetic material was taken from the Takarkori rock shelter in southwestern Libya, where it was protected from the high temperatures and strong ultraviolet light that make ancient DNA so rare in the region.
https://www.nature.com/articles/d41586-025-01020-3

NATURE BRIEFING – Where conscious perception comes from

Neuroscientists have observed for the first time how structures deep in the brain are activated when the brain becomes aware of its own thoughts. People who had thin electrodes injected deep into their brains as part of a treatment for headaches allowed scientists to study their brain signals and measure conscious awareness. The study found that a deep-brain structure called the thalamus filters which thoughts we become aware of and which we don't.
https://www.nature.com/articles/d41586-025-01021-2

NEWS FROM SCIENCE – Skeletons from 'green Sahara' offer genetic peek at a lost human population

Ancient DNA sheds light on a fleeting, lush interlude of North African prehistory.
https://www.science.org/content/article/skeletons-green-sahara-offer-genetic-peek-lost-human-population

NEWS FROM SCIENCE – 'Uniquely human' language capacity found in bonobos

In a first, researchers have seen a nonhuman animal combine different calls to make new meanings.
https://www.science.org/content/article/uniquely-human-language-capacity-found-bonobos

SCIENCEADVISER – Two human-unique genes generate the size and complexity of our brains

When it comes to size and complexity, there's really no beating the human brain. With an average volume of about 1300 cubic centimeters, it's three times bigger—and contains many more folds—than the brain of our closest living relative, the chimpanzee. And even though enormous animals like whales and elephants may have more gray matter than we do, when adjusted for body size, the human cerebral cortex reigns supreme. But how exactly did our brains become so large and complex?

In a new study, scientists investigated the role of two different genes, both of which are unique to humans and affect early brain cells called apical progenitors (APs). They found that one gene, NOTCH2NLB, makes APs multiply more before they start turning into other, more specialized cells. The other gene, NBPF14, changes the way these APs divide, causing them to split at an angle instead of straight up and down. As a result, some of the cells in the pool end up creeping off to a different part of the brain, where they transform into basal radial glia—important progenitor cells that ultimately give rise to neurons.

The delicate interplay between these two genes, the team reports in Science Advances, has pushed the human brain to become uniquely large and complex. "Our findings deepen the fundamental understanding of brain development and provide new insights into the evolutionary origins of our large brain," lead study author Nesil Eşiyok says in a statement. The new research could also shed light on how certain developmental brain disorders arise, she adds, potentially paving the way for new treatments.

To tease out this relationship between NOTCH2NLB and NBPF14, the scientists combined two types of experiments. In addition to injecting the genes into the brains of developing mouse embryos, they also harnessed a technique known as electroporation—which uses an electrical pulse to create tiny holes in cell membranes—to genetically modify tiny, three-dimensional organoids grown from chimpanzee brain cells. The team was excited to find that both methods produced similar, complementary results. "This not only emphasizes the high significance of our results," says study corresponding author Michael Heide, "but could also help to reduce the need for animal experiments in the future."
https://www.science.org/doi/10.1126/sciadv.ads7543

SCIENCEADVISER – Ever more complex

An interdisciplinary team of researchers has a radical proposal: that complexity increases over time. As one of the team put it, "information itself might be a vital parameter of the cosmos, similar to mass, charge and energy."
https://www.quantamagazine.org/why-everything-in-the-universe-turns-more-complex-20250402/

SCIENCEADVISER – 'Uniquely human' language capacity found in bonobos

Humans can combine words to create new meanings—an ability that gives language its expressive power and sets it apart from the communication of other animals. Now, researchers have found a more modest version of this ability in bonobos, our closest living relative.

The team spent 8 months following wild bonobo groups in the Kokolopori Bonobo Reserve in the Democratic Republic of Congo, recording hundreds of vocalizations and the context in which they occurred. These vocalizations were often combinations of two distinct calls—and sometimes, these combined calls appeared to take on a new meaning, just as humans combine words to create something that is more than the sum of its parts.

"Low hoot", for instance, appeared to mean something like "I am excited." "High hoot", on the other hand, was more "Pay attention to me." But the combination of "low hoot + high hoot" meant something much more nuanced that simply "I am excited, pay attention to me". Bonobos used this combination specifically when another individual was putting on an aggressive display, suggesting they were trying to stop that animal from displaying or get others in the group to divert their attention to the caller. The findings suggest that bonobos have a "precursor" to the human capacity to combine units of language to create new meanings, says senior author Simon Townsend.

https://www.science.org/doi/10.1126/science.adv1170

SCIENCE DAILY – How did the large brain evolve?

Two specific genes that evolve exclusively in humans jointly influence the development of the cerebrum. Researchers have provided evidence that these genes contribute together to the evolutionary enlargement of the brain.

https://www.sciencedaily.com/releases/2025/03/250326154423.htm

SCIENCE DAILY – Chimpanzees choose toolmaking materials for structural and mechanical properties

Researchers have discovered that chimpanzees living in Gombe Stream National Park in Tanzania employ a degree of engineering when making their tools, deliberately choosing plants that provide materials that produce more flexible tools for termite fishing.

https://www.sciencedaily.com/releases/2025/03/250324142002.htm

SCIENCE DAILY – Communications network features affect shared social identity & group performance

Researchers explored how the characteristics of communication networks in groups (i.e., density and centralization) affected the development of shared social identity and, as a result, group performance. The study's findings can help managers and other business leaders develop strategies to enhance the performance of their teams.

https://www.sciencedaily.com/releases/2025/03/250325141719.htm

SCIENCENEWS – Neandertal-like tools found in China present a mystery

A style of primitive stone tools named for the French site where they were first discovered have shown up half a world away.

https://www.sciencenews.org/article/neandertal-quina-tools-china-travel

OTHER NEWS – In Memory of Kanzi

Kanzi means so much to so many people. Our team is absolutely devastated by Kanzi's passing. A favorite among his bonobo family members, Kanzi was a friend to everyone. We are focused on ensuring Kanzi's bonobo family members and human caregivers receive the care and support that they need. We ask for time and patience as we grieve the passing of our dearest friend, Kanzi.

https://www.apeinitiative.org/remembering-kanzi

PUBLICATIONS

Animal Behaviour

PAPERS

MAISA SEKIZAWA & NOBUYUKI KUTSUKAKE – Influence of proximate individuals on self-scratching behaviour in wild Japanese macaques

In group-living animals, it is important to understand how individuals perceive the quality of social relationships because it subsequently affects their decision-making during social interactions. One way to assess how individuals perceive the quality of social relationships is to examine contexts and social factors affecting individuals' stress levels. In this study, we aimed to examine the influence of individuals in proximity (within 1 m) on stress levels during resting and foraging behaviour in wild Japanese macaques, Macaca fuscata, on Kinkazan Island, Japan. We collected data on self-scratching, a behavioural indicator of stress, from 11 adult females across 58 days. During rest, the frequency of self-scratching was higher in the absence of proximate individuals than in their presence. However, social relationships between the focal individual and a proximate female did not affect the frequency of self-scratching. In contrast, during foraging, there was no significant difference

between the frequency of self-scratching in the absence and the presence of proximate individuals. However, the frequency of self-scratching was higher in proximity to a related female than in proximity to an unrelated female. These results suggest that stress levels due to proximity to other individuals are influenced by the focal individual's activity. Furthermore, these results indicate that foraging competition among related individuals and spatial separation from other individuals is one of the causes of stress in this species.
https://www.sciencedirect.com/science/article/abs/pii/S0003347225000387

YUMENG ZHAO et al – Social tolerance plays a key role in shared leadership
Shared leadership in consensus decision making has been observed in the collective movements of various mammalian species. While multiple social interactions influence this decision-making pattern, the link between social tolerance and the characteristics of collective movement remains underexplored. In this study, we propose a new 'social tolerance' hypothesis, suggesting that 'social tolerance covaries with the level of shared leadership in collective movement'. We filmed 50 groups of Père David's deer, Elaphurus davidianus, by drone and collected collective movement characteristics and social tolerance characteristics on group and individual levels. Our findings revealed that (1) at the group level, tolerant groups showed higher levels of shared leadership, characterized by a higher proportion of leaders. Groups with higher proportions of females distributed leadership more evenly among their members. (2) At the individual level, females who formed more proximity interactions and males with higher dominance displayed higher leadership scores. Low-ranking females adopted an accelerated pace in recruiting followers, whereas none of the social tolerance characteristics in males correlated with followers' joining latency. In addition, females demonstrated a more equal distribution of shared leadership than males. These results may be due to differences in reproductive strategies between males and females. Although our work provides limited evidence for the 'social tolerance' hypothesis, we aimed to provide a deeper insight into the mechanisms by which social tolerance influences collective movements.
https://www.sciencedirect.com/science/article/abs/pii/S0003347225000533

AINA COLOMER-VILAPLANA et al – Social learning of navigational routes in tandem-running acorn ants, Temnothorax nylanderi
Tandem running in ants is a form of social learning that involves an informed leader guiding a naïve nestmate to a valuable resource, such as a nest site or a food source. Little is currently known about what tandem followers learn and how socially acquired navigational information affects future trips. While some studies suggest that tandem followers learn the resource position but not the route taken by the tandem pair to reach the resource, more recent evidence contradicts this view. We studied tandem running in foraging acorn ants, Temnothorax nylanderi, and provide evidence that tandem followers socially learn routes from their leaders and later use these routes when travelling between their nest and a food source. Followers that became tandem leaders themselves then guided their follower along the same routes in 90% of tandem runs, demonstrating that navigational information can spread in a forager population through sequential social learning. Ants increased their travelling speed, but not path straightness over successive trips. We also found that ants needed less time on subsequent trips if they experienced longer-lasting tandem runs, suggesting that longer-lasting tandem runs allow followers to learn routes more efficiently. Adding potentially salient visual cues did not affect most of the quantified variables, and we currently know little about the cues used by T. nylanderi during navigation. We discuss how the visual environment inhabited by different species might affect the importance of route learning during tandem running.
https://www.sciencedirect.com/science/article/pii/S000334722500034X

Childhood in the Past

REVIEWS

BRENNA R. HASSETT – Father Time: A Natural History of Men and Babies
Review of 'Father Time: A Natural History of Men and Babies' by Sarah Blaffer Hrdy, Princeton University Press, 2024.
https://www.tandfonline.com/doi/full/10.1080/17585716.2025.2479880

Current Anthropology

PAPERS

MICHAEL SCHNEGG – Collective Loneliness: Theorizing Emotions as Atmospheres
Damara pastoralists experience January as !Ūke-ai (collective loneliness). This is also how they experience the time after a drought. To explore this feeling, I draw on the phenomenology of Hermann Schmitz, who suggests that we take emotions out of the "box" of the psyche and theorize them as atmospheres. In this view, every situation is a constellation of human and nonhuman bodies, and atmospheres are the felt space in between that connects and transcends these entities. To feel is to resonate with atmospheres. My theoretical intervention is to develop how the absence of entities that are still present in narratives and memories changes the atmosphere. In both situations—January and after a drought—the temporal absence of things (such as people, animals, and practices) leaves a "hole" that touches people affectively, haunts them, and leads to !Ūke-ai. But what causes these absences? In Namibia, colonial and postcolonial processes have created an economy characterized by land scarcity and circular migration patterns. Recognizing how events of the past create rhythmic absences

in the present allows for the intertwining of feelings with historical processes, including marginalization and coloniality. Ultimately, it also allows for the politicization of feelings while acknowledging that people sometimes strive to not be touched and sometimes succeed.
https://www.journals.uchicago.edu/doi/abs/10.1086/734796

eLife

PAPERS

CHEN XIE, SVEN KÜNZEL & DIETHARD TAUTZ – Fast evolutionary turnover and overlapping variances of sex-biased gene expression patterns defy a simple binary classification of sexes

The phenotypic differences between the sexes are generated by genes with sex-biased expression. These range from a few major regulators to large numbers of organ-specific effector genes in sexually mature individuals. We explore the variation and evolutionary patterns of these genes in a large dataset from natural populations of sub-species and species of mice across an evolutionary distance of two million years. Within these short phylogenetic distances, we find a faster evolutionary turnover of sex-biased gene expression compared to non-sex-biased genes and a faster adaptive protein evolution for the genes that are sex-biased in a given taxon. We show that sex-biased genes occur only in a subset of the co-expression modules of each organ and the turnover of genes between the taxa occurs often within the main modules. Given that our dataset is the first in animals that was generated in a combined population genetic and phylogenetic context, we were interested to study the within-group variances for sex-biased gene expression in somatic and gonadal tissues and their evolutionary turnover. To visualize the individual variances, we have developed a sex-biased gene expression index (SBI) that represents the cumulative expression of all sex-biased genes for each individual in each organ. We find that SBI distributions can range from close to binary patterns to overlapping patterns between the sexes. They do not correlate between organs of the same individuals, thus supporting a mosaic model of sex-determination of individuals. Comparison with data from humans shows fewer sex-biased genes compared to mice and strongly overlapping SBI distributions between the sexes. We conclude that sex-biased genes are subject to fast evolution, with no long-term stability for male or female expression characteristics.
https://elifesciences.org/reviewed-preprints/99602

LEE R BERGER et al – Evidence for deliberate burial of the dead by Homo naledi

The authors study the context of the skeletal remains of three individuals and associated sediment samples to conclude that the hominin species Homo naledi intentionally buried their dead. Demonstration of the earliest known instance of intentional funerary practice - with a relatively small-brained hominin engaging in a highly complex behavior that has otherwise been observed from Homo sapiens and Homo neanderthalensis - would represent a landmark finding. The authors have revised their manuscript extensively in light of the reviews of their initial submission, with improved illustration, context, discussion, and theoretical frameworks, leading to an improved case supporting their conclusion that Homo naledi intentionally buried their dead. One of the reviewers concludes that the findings convincingly demonstrate intentional burial practices, while another considers evidence for such an unambiguous conclusion to be incomplete given a lack of definitive knowledge around how the hominins got into the chamber. We look forward to seeing the continued development and assessment of this hypothesis. It is worth noting that the detailed reviews (both rounds) and comprehensive author response are commendable and consequential parts of the scientific record of this study. The editors note that the authors' response repeatedly invokes precedent from previous publications to help justify the conclusions in this paper. While doing so is helpful, the editors also note that scientific norms and knowledge are constantly evolving, and that any study has to rest on its own scientific merit.
https://elifesciences.org/reviewed-preprints/89106

Frontiers in Psychology

PAPERS

SHUJIE YUAN & ZENGZHEN ZHAO – Do altruistic tendencies lead to the persistence of voluntary behavior? A moderated mediation analysis

In the postpandemic period, more attention has been given to the sustainability of volunteering in China. Do altruistic tendencies lead to the persistence of voluntary behavior in collectivistic culture? This study examined the relationship between altruistic tendencies and the persistence of voluntary behavior as well as the mediating effect of affective organizational commitment and the moderating effect of psychological collectivism.
A two-wave study was conducted among 423 young volunteers in the Yangtze River Delta from February through April 2024. Model 4 and Model 7 from the SPSS macro PROCESS were used to test the model.
The sample data collected supported all the hypotheses. Specifically, the findings revealed that altruistic tendencies positively predicted the persistence of voluntary behavior among young volunteers. Affective organizational commitment partially mediated the relationship between altruistic tendencies and the persistence of voluntary behavior. Psychological collectivism positively moderated the relationship between altruistic tendency and affective organizational commitment and played a positive moderating role in the first half of the mediating path.

This study tested a moderated mediation framework in collectivistic culture. It revealed the mechanism underlying the influence of altruistic tendencies on the persistence of voluntary behavior, thus identifying important implications concerning the effective guidance of voluntary behavior and volunteer management.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1553888/full

HANNA LINDFORS et al – Similarities in semantic processing across verbal and pictorial domains in school children with developmental language disorder

This study investigates whether Developmental Language Disorder (DLD) is a specific language impairment or a domain-general disorder, thereby addressing the broader question of whether language processing is distinct from or comparable to cognitive processing in other domains. Specifically, we investigate semantic processing in verbal and pictorial domains among 9–12-year-old children with DLD in comparison to an age-matched control group. We measured the amplitude of the event-related potential (ERP) effect indicating semantic processing, the N400, to narratives in the form of both auditorily presented sentences and of wordless picture sequences (comic strips). We compared the N400 effect of predictability in both domains across group. Our findings from a total of 39 participants show an expected N400 effect in both domains in age-matched controls, though with longer latency for the more unfamiliar picture domain but no N400 effect in either domain in children with DLD. This study, thus, indicates similarities in semantic processing across the verbal and the pictorial domains in children with DLD, which is consistent with domain general theories of language.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1548289/full

PEDRO ALEIXO NOGUEIRA et al – From classic models to new pathways: unraveling the anatomy and function of the inferior fronto-occipital fasciculus in language processing

This study explores the anatomy and function of the inferior fronto-occipital fasciculus (IFOF), focusing on its role in language processing. Through a comprehensive systematic review and detailed anatomical dissections, we aim to elucidate the IFOF's anatomical organization, its contributions to language processing, and its complex three-dimensional configuration, ultimately enhancing the safety and precision of neurosurgical practices.

This study employed a two-part methodology: (1) anatomical dissections using Klinger's technique on three human brains, which were fixed and frozen; and (2) a systematic literature review adhering to PRISMA guidelines, with a search of the EMBASE and PubMed databases on January 1, 2025, analyzing 510 studies on IFOF anatomy and function, with a focus on its role in language processing and implications for neurosurgical practice.

Anatomical dissections identified the IFOF as a prominent anterior–posterior white matter tract with distinct dorsal and ventral components. The dorsal component links the pars triangularis and pars orbitalis of the frontal lobe to the superior parietal lobe and posterior occipital gyri, while the ventral component connects the inferior occipital gyrus and posterior basal temporal region to the dorsolateral prefrontal and orbitofrontal cortices. The IFOF was found to traverse through key areas, including the extreme capsule, insula, and claustrum, and was closely associated with the uncinate fasciculus. The systematic literature review included 15 studies, highlighting the IFOF's critical role in cognitive and linguistic functions, particularly in semantic language processing, reading, naming, and integrating visual information for meaning interpretation. It plays a key role in language comprehension by connecting posterior visual regions to anterior semantic areas. The IFOF also contributes to visual attention and spatial processing, underscoring its importance in contemporary linguistic models. Damage to the IFOF can cause semantic paraphasia, reading difficulties, spatial neglect, and aphasia, highlighting its crucial role in language and cognitive functioning.

The IFOF plays a pivotal role in integrating visual, motor, and semantic information, facilitating complex interactions between cognitive, linguistic, and visuospatial functions. Its dorsal component aids visuospatial integration, while the ventral component underpins semantic processing. The IFOF's anatomical and functional complexity underscores its critical consideration in neurosurgical planning.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1561482/full

AHMET ZEKI GUVEN et al – The mediating role of optimism between reading habits and meaningful living

The present study sought to examine the relations between reading habits, perceived meaningful living, and optimism through structural equation modeling. To this end, we recruited undergraduate students enrolled in the Turkish language teaching program of a state university and collected the data using the Reading Attitude and Habits Scale, the Meaningful Living Scale and the Optimism-Pessimism Questionnaire. More than half (58.4%) of students were females, 52% were aged 21–30 years, and 34.2% were second-year students. The data were analyzed using SPSS 24.0 and SPSS AMOS 20.0. The findings showed a significant relationship between reading habits and meaningful living, with optimism serving as a significant mediator. Model fit indices confirmed the validity of the SEM model (RMSEA = 0.061, CFI = 0.94, TLI = 0.96). We also found that optimism served as a significant mediator in the relation between reading habits and perceived meaningful living. The findings suggest encouraging undergraduate students' reading habits and designing and offering counseling services to foster students' optimism and perceived meaningful living. Moreover, further research with diverse demographic groups is needed to elucidate more on the subject.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1573682/full

BLANCA PALOMERO-SIERRA et al – Early social communication and language development in moderate-to-late preterm infants: a longitudinal study

This study investigates early development and language acquisition in moderate-to-late preterm (MLPT) infants, focusing on social communication as a key factor. Using a longitudinal design, social communicative, cognitive and language outcomes were assessed at 12, 18, and 24 months in 106 infants, including 49 MLPT and 57 full-term (FT) infants. Standardized tools, including the Bayley Scales of Infant and Toddler Development (Bayley-III), the Vineland Adaptive Behavior Scales (Vineland-3), and the Social Attention and Communication Surveillance-Revised (SACS-R), were used to assess early developmental performance. Group differences and the interaction between group and assessment time points were analyzed to examine developmental patterns over time. Additionally, predictive models identified early indicators of receptive and expressive language performance at 24 months. The results revealed significant developmental delays in the MLPT group compared to their FT peers, with receptive language showing the most pronounced deficits. Early social communication behaviors, such as pointing, following a point, and attending to sounds at 12 months, emerged as strong predictors of both receptive and expressive language performance. Cognitive abilities also played a significant role, particularly in receptive language development. These findings underscore the utility of tools like the SACS-R in identifying early communication challenges and guiding tailored support strategies. Sustained developmental monitoring and targeted interventions that foster communication skills may promote positive language outcomes in MLPT infants, supporting their long-term developmental potential within this population with increased developmental needs.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1556416/full

International Journal of Entomology

PAPERS

MICHAEL JOSEPH JOWERS et al – Novel tool use in Tapinoma sp. ants (Hymenoptera: Formicidae)

Despite over 14,000 known species of ants on earth, a massive biomass, and their intrinsic social evolution, very little is known about how ants perceive their environment. In the face of such vast biodiversity, only about 50 species have been reported to use tools, which suggests unknown facets in myrmecological research. Herein, we report on a field observation where multiple Tapinoma workers restrained a large Camponotus worker for several hours without apparently inflicting injury. The Tapinoma workers used tools (stones) that were placed under the Camponotus worker, seemingly employing them as anchors against which they affixed themselves to restrain the seized ant. In addition, Tapinoma workers attached themselves to the head of the Camponotus which seemed to blind it temporarily and restrict use of its mandibles. Such behaviour in ants demonstrates possible cognitive understanding of their environment and colony socio-adaptation.
{Interesting but anecdotal, so not really evidence of a pre-existing strategy involving tools.}
https://www.tandfonline.com/doi/full/10.1080/00379271.2025.2467429

Journal of Linguistics

PAPERS

RICHARD HUDSON et al with GRAEME TROUSDALE – The syntactic constraint on English auxiliary contraction

We offer a new explanation for the difference between cases where an auxiliary verb can and cannot contract, such as Kim is coming versus Kim is. Rather than a banning constraint, we argue that there is a positive syntactic licensing constraint. We consider, and reject, both the familiar Gap Restriction and a range of phonological explanations. Our analysis rests on the category of grammatical relations, valent, which includes all non-adjuncts (i.e. all subjects and complements); the analysis consists of a single claim, the Following Valent Constraint: that a contracted auxiliary has an overt following valent. We show how this analysis explains the full range of data that has been discussed in the literature and how a minor variant of the constraint captures the data of the Scots locative discovery expressions. We also propose a sociolinguistic explanation for the inability of auxiliaries to contract in certain environments, such as after a preposed negative. Finally, we suggest a functional explanation for the proposed constraint: It allows the hearer to predict the presence of a following valent and thereby to manage the burden of processing.
https://www.cambridge.org/core/journals/journal-of-linguistics/article/syntactic-constraint-on-english-auxiliary-contraction/B082449AA4A20838000218A6CC9C3AD2

Journal of the Royal Society Interface

PAPERS

MING WE et al – Indirect reciprocity in the public goods game with collective reputations

Indirect reciprocity unveils how social cooperation is founded upon moral systems. Within the frame of dyadic games based on individual reputations, the 'leading-eight' strategies distinguish themselves in promoting and sustaining cooperation. However, in real-world societies, there are widespread interactions at the group level, where individuals need to make a singular action choice when facing multiple individuals with different reputations. Here, through introducing the assessment of collective reputations, we develop a framework that embeds group-level reputation structure into public goods games to study the evolution of group-level indirect reciprocity. We show that changing the criteria of group assessment destabilizes the reputation dynamics of leading-eight strategies. In a particular range of social assessment criteria, all leading-eight

strategies can break the social dilemma in public goods games and sustain cooperation. Specifically, there exists an optimal, moderately set assessment criterion that is most conducive to promoting cooperation. Moreover, in the evolution of assessment criteria, the preference of the leading-eight strategies for social strictness is inversely correlated with the payoff level. Our work reveals the impact of social strictness on prosocial behaviour, highlighting the importance of group-level interactions in the analysis of evolutionary games and complex social dynamics.
https://royalsocietypublishing.org/doi/full/10.1098/rsif.2024.0827

Lithic Technology

PAPERS

ANTON R. LADA & VASILISA S. SMOLKINA – Nice and Oval: Early Upper Paleolithic Bifaces from IVb Cultural Layer of Kostenki 14

Kostenki 14 cultural layer IVb, dated to 40–41.5 ka cal BP, represents one of the earliest manifestations of Anatomically Modern Humans in Eastern Europe. Its lithic assemblage shares traits with the Protoaurignacian and Aurignacian sensu lato but includes distinctive oval plano-convex and bi-convex bifaces, complicating its interpretation. Our study focuses on the production and utilization of bifaces. We conclude that, with a few exceptions, these pieces — previously thought to be tools — are primarily blade and bladelet core preforms. Based on the provided description of blade and bladelet production methods in the assemblage, it is also suggested that burin busqué and the burin de Vachons previously considered 'specific' to the assemblage are, in fact, typical carinated burins that represent minor deviations from the main bladelet production sequence. New interpretation of bifacial pieces reveals a stronger similarity between the Kostenki 14 IVb assemblage and other Protoaurignacian/Early Aurignacian sites in Europe.
https://www.tandfonline.com/doi/full/10.1080/01977261.2025.2480892

Medical Anthropology

PAPERS

BARBARA FRUTH – Self-Medication in Humans (Homo sapiens) and Bonobos (Pan paniscus) in the Democratic Republic of the Congo

In this article I engage with the complex interplay of primates, plants and parasites. We learn about the ethnobotanical records of an indigenous population and their medicinal plants, and get a glimpse into the interplay of man and ape in a jointly used ecosystem. I combine my long-term research on free-living bonobos, a species endemic to the Democratic Republic of the Congo, with historical work. I show the surprising and extraordinary ingestion of Manniophyton fulvum, a wild Euphorbiaceae plant widely used across Africa, bearing specific chemical and mechanical properties that make it suitable for gastro-intestinal self-care.
https://www.tandfonline.com/doi/full/10.1080/01459740.2025.2482139

Nature

NEWS

Rare ancient DNA from Sahara opens a window on the region's verdant past

Sequencing of 7,000-year-old human genomes from when the Sahara Desert was green suggest that pastoralism spread through cultural exchange, not large-scale migration.
https://www.nature.com/articles/d41586-025-00755-3

PAPERS

NADA SALEM et al with KAY PRÜFER & JOHANNES KRAUSE – Ancient DNA from the Green Sahara reveals ancestral North African lineage

Although it is one of the most arid regions today, the Sahara Desert was a green savannah during the African Humid Period (AHP) between 14,500 and 5,000 years before present, with water bodies promoting human occupation and the spread of pastoralism in the middle Holocene epoch1. DNA rarely preserves well in this region, limiting knowledge of the Sahara's genetic history and demographic past. Here we report ancient genomic data from the Central Sahara, obtained from two approximately 7,000-year-old Pastoral Neolithic female individuals buried in the Takarkori rock shelter in southwestern Libya. The majority of Takarkori individuals' ancestry stems from a previously unknown North African genetic lineage that diverged from sub-Saharan African lineages around the same time as present-day humans outside Africa and remained isolated throughout most of its existence. Both Takarkori individuals are closely related to ancestry first documented in 15,000-year-old foragers from Taforalt Cave, Morocco2, associated with the Iberomaurusian lithic industry and predating the AHP. Takarkori and Iberomaurusian-associated individuals are equally distantly related to sub-Saharan lineages, suggesting limited gene flow from sub-Saharan to Northern Africa during the AHP. In contrast to Taforalt individuals, who have half the Neanderthal admixture of non-Africans, Takarkori shows ten times less Neanderthal ancestry than Levantine farmers, yet significantly more than contemporary sub-Saharan genomes. Our findings suggest that pastoralism spread through cultural diffusion into a deeply divergent, isolated North African lineage that had probably been widespread in Northern Africa during the late Pleistocene epoch.

https://www.nature.com/articles/s41586-025-08793-7

Nature Human Behaviour

PAPERS

YU QI et al – Human motor cortex encodes complex handwriting through a sequence of stable neural states

How the human motor cortex (MC) orchestrates sophisticated sequences of fine movements such as handwriting remains a puzzle. Here we investigate this question through Utah array recordings from human MC during attempted handwriting of Chinese characters (n = 306, each consisting of 6.3 ± 2.0 strokes). We find that MC activity evolves through a sequence of states corresponding to the writing of stroke fragments during complicated handwriting. The directional tuning curve of MC neurons remains stable within states, but its gain or preferred direction strongly varies across states. By building models that can automatically infer the neural states and implement state-dependent directional tuning, we can significantly better explain the firing pattern of individual neurons and reconstruct recognizable handwriting trajectories with 69% improvement compared with baseline models. Our findings unveil that skilled and sophisticated movements are encoded through state-specific neural configurations.

https://www.nature.com/articles/s41562-025-02157-x

Nature Reviews Biodiversity

PAPERS

CHRISTIAN ROOS et al – Genomic basis of non-human-primate diversity and adaptation

The order Primates includes more than 500 extant species highly variable in body and brain size, activity and locomotor patterns, diet, habitat and social system. A deeper understanding of the nature and evolutionary origins of this diversity has several benefits, such as a more complete comprehension of mammalian evolution, valuable insight for primate conservation as well as an improved understanding of the development and origin of the unique human phenotype. The number of non-human-primate species for which high-quality reference genomes and re-sequencing data from multiple individuals are available has increased substantially since 2014, enabling comprehensive genome-wide and population-level genomic analyses across different primate species. In this Review, we provide an overview of knowledge regarding genetic diversity and the genetics of adaptive evolution across this order. We describe specific examples of putative genetic mechanisms underlying anatomical and physiological changes and adaptations to particular environmental challenges. We identify key future directions for the field, including the need for additional reference genomes and functional assays, and expanded analysis of genome structure, transcriptomics and epigenetics. We highlight the importance of investigating understudied primate clades, and discuss how insights from genomic research can contribute to primate conservation.

https://www.nature.com/articles/s44358-025-00039-8

Nature Reviews Psychology

PAPERS

LASANA T. HARRIS & NAIRA DELGADO – The functional role of interpersonal dehumanization and associated brain networks

Dehumanization is typically considered as an intergroup phenomenon, whereby people are reduced to less-than-human status on the basis of group affiliations. However, in everyday life, people often disregard the emotional states of others, which could be considered a more subtle form of dehumanization. In this Review, we examine interpersonal dehumanization, which we define as a failure to infer another person's mental state. First, we describe the functions of interpersonal dehumanization at three temporal scales: as retrospective justification for past moral violations, as a facilitator of present behaviours and as a proactive empathy-regulation strategy. Next, we consider the brain networks that facilitate and influence daily dehumanization: specifically, networks associated with social cognition, empathy and moral decision making. We conclude by suggesting future research directions for the study of interpersonal dehumanization and its implications that could inform the development of concrete solutions to foster more humane and ethical interactions in everyday life.

https://www.nature.com/articles/s44159-025-00439-9

Nature Scientific Data

PAPERS

TAMARA GUREVICH et al – A Dataset on Linguistic Connectivity Across and Within Countries

We construct a new global dataset on common language. The data cover 242 countries and territories and are based on information about the speakers of 6,675 languages. Using data from Ethnologue, we provide 11 bilateral measures reflecting different dimensions of linguistic connections within and between countries, including common official languages, common native and acquired languages, and linguistic proximity across different languages. A key novelty of the dataset is that it includes consistently defined information on linguistic relationships not only between different countries but within the administrative borders of countries as well.

https://www.nature.com/articles/s41597-025-04692-8

LUCY TIMBRELL et al – Climate seasonality and predictability during the middle stone age and implications for technological diversification in early Homo sapiens
Regionalisation is considered to be a hallmark of the Middle Stone Age (MSA) compared to the Early Stone Age. Yet what drove diversification around a shared technological substrate that persisted across Africa for hundreds of thousands of years remains debated. Non-mutually exclusive hypotheses include region-specific styles in manufacture, social signalling, cultural drift between geographically isolated populations, and diverse environmental adaptations, as well as the impacts of unequal research histories and intensities. We explore the potential ecological bases of behavioural diversity during the MSA between two well-studied and diverse areas: eastern and northwestern Africa. We utilise a set of standardised bioclimatic simulations, as well as a time series decomposition algorithm, to determine the nature and extent of regional differences in terms of environmental productivity, seasonality and predictability at MSA sites through time. Our results highlight that, compared to human occupations of eastern Africa, northwestern African MSA occupations are associated with colder, drier and less productive environments, albeit colder, but wetter and more productive compared to surrounding areas, with higher temperature seasonality and more predictable climates across millennia. We then theoretically consider the implications of our results for technological diversification between these two regions during the Middle to Late Pleistocene, such as for the investment in specific risk mitigation strategies for dealing with seasonally mobile resources in northern localities, and the diversification of MSA toolkits in tropical eastern Africa.
https://www.nature.com/articles/s41598-025-95573-y

New Scientist

NEWS

Unusually tiny hominin deepens mystery of our Paranthropus cousin
Paranthropus was an ape-like hominin that survived alongside early humans for more than a million years. A fossilised leg belonging to a strikingly small member of the group raises questions about how it did so.
https://www.newscientist.com/article/2473905-unusually-tiny-hominin-deepens-mystery-of-our-paranthropus-cousin/

Monkeys use crafty techniques to get junk food from tourists
At the Dakshineswar temple complex in India, Hanuman langurs beg for food by grabbing visitors' legs or tugging on their clothes – and they don't stop until they get their favourite snacks.
https://www.newscientist.com/article/2474184-monkeys-use-crafty-techniques-to-get-junk-food-from-tourists/

ARTICLES

COLIN BARRAS – The animals revealing why human culture isn't as special as we thought
Even animals with very small brains turn out to have cultural traditions, which poses a puzzler for biologists wondering what makes human culture unique.
https://www.newscientist.com/article/mg26635374-000-the-animals-revealing-why-human-culture-isnt-as-special-as-we-thought/

GINA RIPPON – A revolutionary new understanding of autism in girls
By studying the brains of autistic girls, we now know the condition presents differently in them than in boys, suggesting that huge numbers of women have gone undiagnosed
https://www.newscientist.com/article/mg26635372-400-a-revolutionary-new-understanding-of-autism-in-girls/

HELEN THOMSON – Why you should slow down your brain's ageing – and how to do it
Many of us have a brain that is older than our years. But there are plenty of things you can do to counteract this.
https://www.newscientist.com/article/2473036-why-you-should-slow-down-your-brains-ageing-and-how-to-do-it/

Philosophical Transactions of the Royal Society B

{I have included what I think are the key papers from this theme issue on 'Nonlinear phenomena in vertebrate vocalizations: mechanisms and communicative functions'. You may wish to check out the whole issue at https://royalsocietypublishing.org/toc/rstb/2025/380/1923. However, I personally remain unsure whether Nonlinear phenomena (NLPs) are defined in relation to an identifiable physical phenomenon of linearity in vocalizations or to a human-defined dichotomy between linearity and nonlinearity. What makes a vocalization linear, and what linearity rules do NLPs break? Is nonlinearity caused by the sound production system, or is it an effect of the human-specific sound reception system? I couldn't find definitive answers to these questions in this issue.}

PAPERS

ANA AMADOR, GABRIEL B. MINDLIN & COEN P. H. ELEMANS – Transitions and tricks: nonlinear phenomena in the avian voice

Birds evolved a novel vocal organ, the syrinx, that exhibits a high anatomical diversity. In the few species investigated, the syrinx can contain up to three pairs of functional syringeal vocal folds, acting as independent sound sources, and eight pairs of muscles. This rich variety in vocal structures and motor control results in a wide range of nonlinear phenomena (NLPs) and interactions that are distinct to avian vocal physiology, with many fascinating mechanisms yet to be discovered. Here, we review the occurrence of classical signatures of nonlinear dynamics, such as NLPs, including frequency jumps and transitions to chaos in birds. However, birds employ several additional unique tricks and transitions of inherent nonlinear dynamical nature that further enrich their vocal dynamics and are relevant for understanding the motor control of their vocalizations. Particularly, saddle-node in limit cycle (SNILC) bifurcations can switch sounds from tonal to harmonically rich and change the physiological control of fundamental frequency. In mammalian phonation, these bifurcations are mostly explored in the context of register transitions but could be equally relevant to altering vocal fold dynamical behaviour. Due to their diverse anatomy compared to mammals, birds provide unique opportunities to explore rich nonlinear dynamics in vocal production.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2024.0007

CHRISTIAN T. HERBST et al with W. TECUMSEH FITCH – 'Monkey yodels'—frequency jumps in New World monkey vocalizations greatly surpass human vocal register transitions

We investigated the causal basis of abrupt frequency jumps in a unique database of New World monkey vocalizations. We used a combination of acoustic and electroglottographic recordings in vivo, excised larynx investigations of vocal fold dynamics, and computational modelling. We particularly attended to the contribution of the vocal membranes: thin upward extensions of the vocal folds found in most primates but absent in humans. In three of the six investigated species, we observed two distinct modes of vocal fold vibration. The first, involving vocal fold vibration alone, produced low-frequency oscillations, and is analogous to that underlying human phonation. The second, incorporating the vocal membranes, resulted in much higher-frequency oscillation. Abrupt fundamental frequency shifts were observed in all three datasets. While these data are reminiscent of the rapid transitions in frequency observed in certain human singing styles (e.g. yodelling), the frequency jumps are considerably larger in the nonhuman primates studied. Our data suggest that peripheral modifications of vocal anatomy provide an important source of variability and complexity in the vocal repertoires of nonhuman primates. We further propose that the call repertoire is crucially related to a species' ability to vocalize with different laryngeal mechanisms, analogous to human vocal registers.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2024.0005

DANIEL T. BLUMSTEIN – Nonlinear phenomena in marmot alarm calls: a mechanism encoding fear?

I review a case study of marmots that contributed to the empirical basis of the nonlinearity and fear hypothesis, which explains why certain nonlinear acoustic phenomena (NLP) are produced in extremely high-risk situations and communicate high urgency. In response to detecting predatory threats, yellow-bellied marmots (Marmota flaviventer) emit alarm calls and, in some situations, emit fear screams. Prior work on marmots has shown that call production is associated with the degree of risk the caller experiences and that they are individually distinctive. Receivers respond to calls and are sensitive to variation in caller reliability. Calls also contain nonlinear acoustic phenomena. Work has shown that socially isolated animals and those infected with Eimeria, an intestinal parasite, produced 'noisier' calls. However, animals that were likely under greater stress (as measured with faecal glucocorticoid metabolites) produced more structured and less noisy calls. The addition of NLP increases responsiveness in receivers. NLP in alarm calls have modest heritability. Taken together, the study of NLP in marmots has enhanced our understanding of the potential information encoded in alarm calls and is consistent with the hypothesis that variation in NLP production communicates fear, which stimulates work with other species, including humans.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2024.0008

FLORIANE FOURNIER et al with ROMAN WITTIG & CATHERINE CROCKFORD – Emotions mediate nonlinear phenomena production in the vocalizations of two ape species

Nonlinear phenomena (NLP) are widely observed in mammal vocalizations. One prominent, albeit rarely empirically tested, theory suggests that NLP serve to communicate individual emotional states. Here, we test this 'emotional hypothesis' by assessing NLP production in the vocalizations of chimpanzees and bonobos across various social contexts. These two species are relevant to test this hypothesis since bonobos are more socially opportunistic than chimpanzees. We found that both species produced, albeit at different frequencies, the same five distinct NLP types. Contextual valence influenced NLP production in both species with negative valence being associated with more frequent NLP production than positive and neutral valence. In contrast, using aggression severity and caller role as proxies for arousal, we found that in bonobos, but not in chimpanzees, vocalizations uttered during contact aggression or from victims and females contained more NLP. In contrast, the type of NLP produced was neither influenced by valence nor arousal in either species. Our study supports the emotional hypothesis regarding the occurrence of NLP production in mammals, particularly in opportunistics such as bonobos. This reinforces the hypothesis of an adaptative role of NLP in animal communication and prompts further investigations into their communicative functions.

https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2024.0013

CHIARA DE GREGORIO et al – Singing out of tune: sexual and developmental differences in the occurrence of nonlinear phenomena in primate songs

Animal vocalizations contain a varying degree of nonlinear phenomena (NLP) caused by irregular or chaotic vocal organ dynamics. Several hypotheses have been proposed to explain NLP presence, from unintentional by-products of poor vocal technique to having a functional communicative role. We aimed to disentangle the role of sex, age and physiological constraints in the occurrence of NLP in the songs of the lemur Indri indri, which are complex harmonic vocal displays organized in phrases. Age and sex affected the presence and type of NLP in songs. In particular, the proportion of the phenomena considered decreased with age, except for subharmonics. Subharmonics potentially mediate the perception of lower pitch, making signallers appear larger. Subharmonics and frequency jumps occurred in lower-pitched notes than regular units, while chaos and sidebands occurred in higher-pitched units. This suggests that different types of NLP can be associated with different vocal constraints. Finally, indris might present short-term vocal fatigue, with units occurring in the last position of a phrase having the highest probability of containing NLP. The presence of NLP in indris might result from proximate causes, such as physiological constraints, and ultimate causes, such as evolutionary pressures, which shaped the communicative role of NLP.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2024.0021

ANDREY ANIKIN, DAVID REBY & KATARZYNA PISANSKI – Nonlinear vocal phenomena and speech intelligibility

At some point in our evolutionary history, humans lost vocal membranes and air sacs, representing an unexpected simplification of the vocal apparatus relative to other great apes. One hypothesis is that these simplifications represent anatomical adaptations for speech because a simpler larynx provides a suitably stable and tonal vocal source with fewer nonlinear vocal phenomena (NLP). The key assumption that NLP reduce speech intelligibility is indirectly supported by studies of dysphonia, but it has not been experimentally tested. Here, we manipulate NLP in vocal stimuli ranging from single vowels to sentences, showing that the vocal source needs to be stable, but not necessarily tonal, for speech to be readily understood. When the task is to discriminate synthesized monophthong and diphthong vowels, continuous NLP (subharmonics, amplitude modulation and even deterministic chaos) actually improve vowel perception in high-pitched voices, likely because the resulting dense spectrum reveals formant transitions. Rough-sounding voices also remain highly intelligible when continuous NLP are added to recorded words and sentences. In contrast, voicing interruptions and pitch jumps dramatically reduce speech intelligibility, likely by interfering with voicing contrasts and normal intonation. We argue that NLP were not eliminated from the human vocal repertoire as we evolved for speech, but only brought under better control.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2024.0254

PLoS Biology

PAPERS

MARTA RODRÍGUEZ ARAMENDÍA, MARIACHIARA ESPOSITO & RAPHAEL KAPLAN – Social knowledge about others is anchored to self-knowledge in the hippocampal formation

Mounting evidence suggests the human hippocampal formation (HF) maps how different people's attributes relate to each other. Yet, it's unclear if hippocampal map-like knowledge representations of other people are shaped by self-knowledge. Here, we test if a prominent heuristic involving an implicit reliance on self-knowledge when rating others, egocentric anchoring-and-adjustment, is present in the HF when relational information about different social entities is retrieved. Participants first provided likelihood ratings of partaking in everyday activities for themselves, fictitious individuals, and familiar social groups. During a neuroimaging task that doesn't require using self-knowledge, participants then learned a stranger's preference for an activity relative to one of the fictitious individuals and inferred how the stranger's preference related to the groups' preferences. Isolating the neural representation of egocentric anchoring when retrieving relational social knowledge, the HF and dorsomedial prefrontal cortex (dmPFC) represented group entities' preferences relative to the self. Furthermore, the HF selectively represented group identity over other learned entities, confirming the HF was primarily engaged by social comparisons in the more ample map-like reference frame. Taken together, these results imply that self-knowledge implicitly influences how the HF learns about others.
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3003050

PLoS One

PAPERS

ISABELL SCHMIDT et al with FELIX RIEDE – Large scale and regional demographic responses to climatic changes in Europe during the Final Palaeolithic

The European Final Palaeolithic witnessed marked changes in almost all societal domains. Despite a rich body of evidence, our knowledge of human palaeodemographic processes and regional population dynamics still needs to be improved. In this study, we present regionally differentiated population estimates for the Greenland Interstadial 1d-a (GI-1d-a; 14-12.7 ka cal

BP) and the Greenland Stadial 1 (GS-1; 12.7-11.6 ka cal BP) for Southern, Western, Northern and Central Europe. The data were obtained by applying the Cologne Protocol, a geostatistical approach for estimating prehistoric population size and density, to a newly compiled dataset of Final Palaeolithic sites. On a large spatio-temporal scale and compared to preceding Upper Palaeolithic phases, areas north of the Alps become the dominant demographic growth area for the first time since the dispersal of anatomically modern humans into Europe. At smaller scales, we observe divergent regional trends, with a conspicuous lack of archaeological evidence appearing in previously occupied areas of central France and Germany. Our study also shows that during the Final Palaeolithic, the climatic cooling of GS-1 coincides with a pronounced population decline in most parts of the study area. An apparent increase in population density occurs only in north-eastern Central Europe and north-eastern Italy. Our estimates suggest that the total population was reduced by half. Similar results, with a relationship between decreasing temperatures and decreasing populations, have already been observed for the late phase of the Gravettian, when populations were reduced to only one third of those estimated for the early phase. Yet, in contrast to the collapse of local populations during the late Gravettian, the increase in population densities in Central Europe during GS-1 indicates population movements eastwards, possibly in response to deteriorating climatic conditions, particularly in western regions during the Younger Dryas.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0310942

MARIJANE LUISTRO JONSSON & MARKUS JONSSON – Cooperation in the face of disaster
As calamities and health crises are expected to recur and become more frequent, we rely more on cooperation to prevent similar situations and to cope with their aftermaths. However, it is not clear if, how and why people cooperate in uncertain situations where losses can result from inadequate cooperation. Through theoretical modelling, experiments and simulations, we show the behavioural patterns driving cooperation in a stochastic environment. Specifically, by introducing stochastic shocks to a threshold public goods game where one can randomly incur losses when group contributions are below a specific level, we investigate what happens to cooperation when disasters strike repeatedly. The findings show that compared to a control setting, cooperation is higher and persists when there is a risk for disasters to strike, and that this is sustained by unconditional cooperation. People give more and do not match the contributions of others, contrasting the conditionality observed in deterministic environments. In other words, we observe a contribution divergence in uncertain environments wherein some give unconditionally while others free-ride. We study three different types of uncertainty about the disaster: the probability of a disaster, additionally if it is uncertain how much cooperation is required to avoid them (threshold level), and how much losses will be incurred (impact). The results are similar in countries having different natural disaster risks, the Philippines and Sweden. Simulating for a longer time period suggests the importance of promoting unconditionality to foster sustained cooperation in facing an uncertain world.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0318891

PNAS

ARTICLES

TIMOTHY A. LINKSVAYER – Social control drove ant evolution
Variation across the ant tree of life reflects many independent evolutionary transformations from small and simple societies to huge and complex societies. The most striking of these contain millions of workers and one or more reproductive queens, which collectively appear to act with unity of purpose. Caste-based reproductive division of labor also varies dramatically across ants, with some lineages having no morphological differences between reproductive and nonreproductive colony members, and other lineages having huge queens that are veritable egg-laying machines and miniature workers that are obligately sterile. In practice, this diversity across the ant tree of life provides tremendous opportunity to identify the causes and consequences of social group transformations that repeatedly occurred, which may help elucidate general mechanisms governing the elaboration of biological complexity. Recent studies using phylogenetic comparative approaches across ants are making exciting progress on these topics. In PNAS, Matte and LeBoeuf studied the evolutionary pathways to complex societies across ants, concluding that increasing social regulation of larval development promoted the elaboration of queen–worker dimorphism.
https://www.pnas.org/doi/full/10.1073/pnas.2502664122

PAPERS

ARTHUR MATTE & ADRIA C. LEBOEUF – Innovation in ant larval feeding facilitated queen–worker divergence and social complexity
Building differences between genetically equivalent units is a fundamental challenge for all multicellular organisms and superorganisms. In ants, reproductive or worker fate is typically determined during the larval stage, through feeding regimes managed by adult caretakers. However, the feeding care provided to larvae varies significantly across ants, as does phenotypic divergence between queen and worker castes. Here, we employed comparative phylogenetic methods and causal inference to investigate the relationships between larval feeding care, caste size dimorphism, and social complexity across ant diversity. We digitized the life's work of George and Jeanette Wheeler, cataloging the larval morphology of over 700 species, and we compiled data on species diets and larval feeding behaviors from the literature and our own observations. We measured queen–worker size dimorphism in 392 species and gathered data for colony size, worker

polymorphism, and worker reproduction. Our analyses revealed that ancestral active-feeding larvae evolved passive morphologies when adults began feeding them individually, typically with processed material and often following a shift to nonpredatory diets. Greater queen–worker size dimorphism coevolved with larval passiveness, alongside traits indicative of increased social complexity, including larger colony sizes, worker subcastes, and a reduction in workers' reproductive potential. Likelihood comparisons of causal phylogenetic models support that extended alloparental care facilitated stronger caste dimorphism, which, in turn and along with increased colony sizes, promoted higher social complexity. Our results suggest that enhanced adult control over larval development enabled greater phenotypic specialization within colonies, with profound implications for social evolution.
https://www.pnas.org/doi/10.1073/pnas.2413742122

Royal Society Open Science

PAPERS

EMIL ISAKSSON et al – Social information use increases with decreasing winter temperature in a passerine bird
Foragers can gain knowledge of profitable foraging opportunities either by sampling the environment directly (asocial information) or from congeners (social information). The relative benefit of using social information over asocial information is context-specific, and social information use is expected to be particularly beneficial when the costs of acquiring asocial information are high, for example, due to high risk of starvation if asocial information fails. We investigated the plasticity of social information use in an overwintering population of black-capped chickadees (Poecile atricapillus) as they rediscovered an intermittently available food source. Lower temperatures impose energetic costs that increase the risk of starvation in chickadees; therefore, lower temperatures are predicted to favour higher use of social information. To test this prediction, we evaluated chickadees' reliance on social information during foraging as ambient temperatures ranged from −11.0°C to 5.5°C. We evaluated the relative strength of reliance on social and asocial information using network-based diffusion analysis. We found increased reliance on social information transmission with decreasing temperature. Reversible plasticity of social information use may be an important mechanism to cope with low ambient temperatures, a seasonal challenge experienced by many animals.
https://royalsocietypublishing.org/doi/full/10.1098/rsos.250180

Science

NEWS

'Uniquely human' language capacity found in bonobos
In a first, researchers have seen a nonhuman animal combine different calls to make new meanings.
https://www.science.org/content/article/uniquely-human-language-capacity-found-bonobos

ARTICLES

AMMIE K. KALAN & LYDIA V. LUNCZ – Saving the cultural legacy of wild animals
Loss of biodiversity threatens the study of tool use and other cultural behaviors in animals.
https://www.science.org/doi/10.1126/science.adj3716

PAPERS

M. BERTHET, M. SURBECK & S. W. TOWNSEND – Extensive compositionality in the vocal system of bonobos
Compositionality, the capacity to combine meaningful elements into larger meaningful structures, is a hallmark of human language. Compositionality can be trivial (the combination's meaning is the sum of the meaning of its parts) or nontrivial (one element modifies the meaning of the other element). Recent studies have suggested that animals lack nontrivial compositionality, representing a key discontinuity with language. In this work, using methods borrowed from distributional semantics, we investigated compositionality in wild bonobos and found that not only does each call type of their repertoire occur in at least one compositional combination, but three of these compositional combinations also exhibit nontrivial compositionality. These findings suggest that compositionality is a prominent feature of the bonobo vocal system, revealing stronger parallels with human language than previously thought.
https://www.science.org/doi/10.1126/science.adv1170

CORRECTIONS

Erratum for the Research Article "Whale song shows language-like statistical structure" by I. Arnon et al.
After publication of the Research Article "Whale song shows language-like statistical structure" (7 February 2025, p. 649), the authors spotted a minor error in the code used for calculating R2 for the analysis of the brevity law. A corrected analysis, using Poisson regression, gives the same results, demonstrating that the detected subsequences show a strong relation between frequency and length, as predicted by Zipf's law of brevity. The error in the code only affected the analysis of Zipf's law of brevity and not the main analyses of Zipf's law of frequency, for which the R2 analysis was appropriately applied. The authors have replaced the Zipf's law of brevity R2 analysis with a Poisson mixed-effects regression, the state-of-the-art method recommended by Youngblood [Proc. Biol. Sci. 291, 20240250 (2024)]. This shows that the brevity law does indeed

hold with P < 0.00001 for all the authors' segmentation methods. Figure 3 and figs. S11 and S12 have been amended to reflect this, and section 6.2 of the code S1 supplementary file has been updated to include the new analysis. These corrections do not affect the conclusions of the paper in any way.
ORIGINAL PAPER: https://www.science.org/doi/10.1126/science.adq7055

Science Advances

PAPERS

NESIL EŞIYOK et al – A dyad of human-specific NBPF14 and NOTCH2NLB orchestrates cortical progenitor abundance crucial for human neocortex expansion

We determined the roles of two coevolved and coexpressed human-specific genes, NBPF14 and NOTCH2NLB, on the abundance of the cortical progenitors that underlie the evolutionary expansion of the neocortex, the seat of higher cognitive abilities in humans. Using automated microinjection into apical progenitors (APs) of embryonic mouse neocortex and electroporation of APs in chimpanzee cerebral organoids, we show that NBPF14 promotes the delamination of AP progeny, by promoting oblique cleavage plane orientation during AP division, leading to increased abundance of the key basal progenitor type, basal radial glia. In contrast, NOTCH2NLB promotes AP proliferation, leading to expansion of the AP pool. When expressed together, NBPF14 and NOTCH2NLB exert coordinated effects, resulting in expansion of basal progenitors while maintaining self-renewal of APs. Hence, these two human-specific genes orchestrate the behavior of APs, and the lineages of their progeny, in a manner essential for the evolutionary expansion of the human neocortex.
https://www.science.org/doi/10.1126/sciadv.ads7543

Trends in Cognitive Sciences

ARTICLES

AVA Q. MA DE SOUSA & HONGBO YU – A framework for studying the conceptual structure of human relationships

How does the mind represent the structure of human relationships? In a recent article, Cheng et al. address this with an interdisciplinary approach combining principal component analysis (PCA), large-scale data collection of human ratings from diverse cultures, and Large Language Model (LLM)-based analyses of historical texts. They reveal a robust 5D framework and three core categories of relationships.
{I wish scientists (who should know better) would stop referring to multi-vector models as multi-dimensional models. A true 5D model is beyond human representation except as a metaphor, whereas a 5-vector model can be fully represented on a 2D sheet of paper.}
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(25)00075-0

Trends in Ecology and Evolution

PAPERS

JENNIFER K. HELLMANN & ANDREW SIH – Integrating social learning, social networks, and non-parental transgenerational plasticity

Transgenerational plasticity (TGP) has largely focused on how parental exposure to ecological conditions shapes the phenotypes of future generations. However, organisms acquire information about their ecological environment via social learning, which can also shape TGP in profound ways. We demonstrate that non-parents alter how parents detect and respond to environmental cues in ways that spillover to affect offspring, non-parents influence offspring even without direct physical interactions, and parental cues received by offspring can alter the phenotypes of other juveniles. Because parents can draw on the experiences of a network of non-parents, these socially acquired cues may increase parents' ability to accurately detect environmental shifts and may explain why TGP is surprisingly ubiquitous despite theory predicting that it should be relatively rare.
https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(24)00309-4

Trends in Genetics

ARTICLES

JOSE MANUEL RUIZ-JIMÉNEZ & GABRIEL SANTPERE – The impact of human accelerated regions on neuronal development

Human accelerated regions (HARs) are the fastest-evolving sequences in the human genome since the divergence from chimpanzees. Some of these regions are suspected to have contributed to the evolution of unique human brain features. Recently, Cui et al. conducted a large-scale study identifying which HARs may have influenced neuronal function.
https://www.cell.com/trends/genetics/fulltext/S0168-9525(25)00052-6

Trends in Neurosciences

PAPERS

BARUCH HAIMSON & ADI MIZRAHI – Integrating innate and learned behavior through brain circuits

Understanding how innate predispositions and learned experiences interact to shape behavior is a central question in systems neuroscience. Traditionally, innate behaviors, that is, those present without prior learning and governed by evolutionarily conserved neural circuits, have been studied separately from learned behaviors, which depend on experience and neural plasticity. This division has led to a compartmentalized view of behavior and neural circuit organization. Increasing evidence suggests that innate and learned behaviors are not independent, but rather deeply intertwined, with plasticity evident even in circuits classically considered 'innate'. In this opinion, we highlight examples across species that illustrate the dynamic interaction between these behavioral domains and discuss the implications for unifying theoretical and empirical frameworks. We argue that a more integrative approach, namely one that acknowledges the reciprocal influences of innate and learned processes, is essential for advancing our understanding of how neuronal activity drives complex behaviors.
https://www.cell.com/trends/neurosciences/abstract/S0166-2236(25)00057-8

MICHAEL GRIESSER et al with JUDITH M. BURKART & NATALIE UOMINI – The power of caring touch: from survival to prosocial cooperation

Cooperation is a pivotal biological phenomenon that occurs in diverse forms. In species that engage in helping, individuals vary in the time they spend together and the degree of their physical proximity, which affects the extent of physical touch between individuals. Here, we propose that touch activates a hormonal feedback loop that supports bond formation and maintenance in mating, parenting, and social contexts. Notably, extended parenting is essential for the emergence of enduring bonds and the development of the prosocial mindset that fosters forms of cooperation with delayed benefits. We incorporate these ideas into the caring-touch hypothesis (CT-H), which emphasizes the role of oxytocin-vasotocin hormones, touch, and enduring bonds in the evolution of different forms of cooperation.
https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(24)00290-8

ANNE J. ROMERO et al – 'Domesticability': were some species predisposed for domestication?

Crop domestication arises from a coevolutionary process between plants and humans, resulting in predictable and improved resources for humans. Of the thousands of edible species, many were collected or cultivated for food, but only a few became domesticated and even fewer supply the bulk of the plant-based calories consumed by humans. Why so few species became fully domesticated is not understood. Here we propose three aspects of plant genomes and phenotypes that could have promoted the domestication of only a few wild species, namely differences in plasticity, trait linkage, and mutation rates. We can use contemporary biological knowledge to identify factors underlying why only some species are amenable to domestication. Such studies will facilitate future domestication and improvement efforts.
https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(24)00315-X

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