EAORC BULLETIN 1,132 – 23 February 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 – Foundations of cumulative culture in apes

Nature Scientific Reports 6:35953 (2016).

SARAH J. DAVIS et al with ANDREW WHITEN – Foundations of cumulative culture in apes: improved foraging efficiency through relinquishing and combining witnessed behaviours in chimpanzees (Pan troglodytes)

A vital prerequisite for cumulative culture, a phenomenon often asserted to be unique to humans, is the ability to modify behaviour and flexibly switch to more productive or efficient alternatives. Here, we first established an inefficient solution to a foraging task in five captive chimpanzee groups (N = 19). Three groups subsequently witnessed a conspecific using an alternative, more efficient, solution. When participants could successfully forage with their established behaviours, most individuals did not switch to this more efficient technique; however, when their foraging method became substantially less efficient, nine chimpanzees with socially-acquired information (four of whom witnessed additional human demonstrations) relinquished their old behaviour in favour of the more efficient one. Only a single chimpanzee in control groups, who had not witnessed a knowledgeable model, discovered this. Individuals who switched were later able to combine components of their two learned techniques to produce a more efficient solution than their extensively used, original foraging method. These results suggest that, although chimpanzees show a considerable degree of conservatism, they also have an ability to combine independent behaviours to produce efficient compound action sequences; one of the foundational abilities (or candidate mechanisms) for human cumulative culture.

https://www.academia.edu/56576379/Foundations_of_cumulative_culture_in_apes_improved_foraging_efficiency_through_relinquishing_and_combining_witnessed_behaviours_in_chimpanzees_Pan_troglodytes

ACADEMIA.EDU – Archaeological and Genetic Foundations of European Population during Late Glacial

Cambridge Archaeological Journal 15:2, 193–223 (2005).

CLIVE GAMBLE et al – The Archaeological and Genetic Foundations of the European Population during the Late Glacial: Implications for 'Agricultural Thinking'

This article presents the initial results from the S2AGES data base of calibrated radiocarbon estimates from western Europe in the period 25,000–10,000 years ago. Our aim is to present a population history of this sub-continental region by providing a chronologically-secure framework for the interpretation of data from genetics and archaeology. In particular, we define five population events in this period, using dates-as-data, and examine the implications for the archaeology of Late Glacial colonization. We contrast this detailed regional approach to the larger project which we call the cognitive origins synthesis that includes historical linguistics in the reconstruction of population history. We conclude that only archaeology can currently provide the framework for population history and the evaluation of genetic data. Finally, if progress is to be made in the new interdisciplinary field of population history then both disciplines need to refrain from inappropriate agricultural thinking that fosters distorting models of European prehistory, and they should also pay less, if any, attention to historical linguistics.

https://www.academia.edu/48337393/The_Social_Brain_and_the_Shape_of_the_Palaeolithic

ACADEMIA.EDU – Conformity to cultural norms of tool use in chimpanzees

Nature 437, 737-740 (2005).

ANDREW WHITEN, VICTORIA HORNER & FRANS B. M. DE WAAL – Conformity to cultural norms of tool use in chimpanzees

Rich circumstantial evidence suggests that the extensive behavioural diversity recorded in wild great apes reflects a complexity of cultural variation unmatched by species other than our own. However, the capacity for cultural transmission assumed by this interpretation has remained difficult to test rigorously in the field, where the scope for controlled experimentation is limited. Here we show that experimentally introduced technologies will spread within different ape communities. Unobserved by group mates, we first trained a high-ranking female from each of two groups of captive chimpanzees to adopt one of two different tool-use techniques for obtaining food from the same 'Pan-pipe' apparatus, then re-introduced each female to her respective group. All but two of 32 chimpanzees mastered the new technique under the influence of their local expert, whereas none did so in a third population lacking an expert. Most chimpanzees adopted the method seeded in their group, and these traditions continued to diverge over time. A subset of chimpanzees that discovered the alternative method nevertheless went on to match the predominant approach of their companions, showing a conformity bias that is regarded as a hallmark of human culture.

https://www.academia.edu/56576316/Conformity_to_cultural_norms_of_tool_use_in_chimpanzees

ACADEMIA.EDU – The Start of Art

In Barbora Putová and Václav Soukup (eds.), The Genesis of Creativity and the Origin of the Human Mind, Karolinum Press, 123-129 (2015).

HARALD FLOSS – The Start of Art

At what point in human history there first appeared modes of behaviour that went beyond the use of tools and other basic subsistence processes – behaviours also associated with many animal species – is a subject of ongoing debate in many fields of study, including anthropology, genetics, cognition and image recognition theory, neurology, social sciences, culture theory, philosophy and pre- and protohistory. My method as an archaeologist differs from certain other approaches in its insistence on empirical evidence, albeit in the knowledge that human behaviour has countless facets that have no connection with the testimony of material culture and as such must remain invisible to archaeology. Another factor is the poor conservation conditions for very old artefacts. It would therefore be wrong to conclude that certain modes of behaviour did not exist simply because certain categories of objects have not been found: "the absence of evidence is not the evidence of absence". Nonetheless, I believe that after 150 years of research the archaeological record of the Palaeolithic now provides a reasonably good picture of how human behaviour evolved. In other words, we believe we are now justified in making statements about the evolution of behaviour based on similarities or differences within the spectrum of objects and artefacts that make up the human legacy. Since the growth of archaeological knowledge proceeds on the basis of concrete evidence, the search for modes of behaviour connected in the broadest sense with aesthetics, symbolism and art must depend on the discovery of objects and artefacts to which such symbolic meaning can be attributed. Regarding the European Palaeolithic, it has been customary to note a marked increase in such artefacts around 40,000 years ago. A clear difference in the spectrum of finds, attested to not only by a change in stone and bone technology but also by a significant increase in objects of personal ornament and artworks, has led researchers to redefine the boundary between the Middle and the Upper Palaeolithic. In the debate about the origins of art this phase of human history has now come to be called the 'creative Big Bang'. In the same context, justified attempts to rehabilitate very early forms of hominids, such as Neanderthals, have in recent years increasingly focused on artefacts of the Lower and Middle Palaeolithic. Similar attention has been given to early forms of sapiens in the African middle stone age, with early evidence of the use of pigments, simple engravings, objects of personal ornament and other finds, such as the controversial 'protofigurines' that attest to a high degree of "cultural modernity" in these peoples long before the onset of the upper Palaeolithic in Europe. A symbolic significance might also be attributed to some early stone artefacts, such as hand axes, on account of their beauty, symmetry and the complex manner of their manufacture. Indeed, reading some authors one almost gets the impression that the transition from the Middle to the Upper Palaeolithic was (no more than) an arbitrary moment essentially no different from earlier or later phases of human history.

https://www.academia.edu/21506038/The_Start_of_Art

ACADEMIA.EDU – What Can Neanderthals Tell Us About Modern Human Origins?

In P. Mellars, K. Boyle, O. Bar-Yosef and C. Stringer (eds.), Rethinking the Human Revolution. McDonald Institute Monographs, 235-248. (2007).

JEAN-JACQUES HUBLIN – What Can Neanderthals Tell Us About Modern Human Origins?

To date, the Neanderthals remain the best-documented group of late Middle/early Upper Pleistocene fossil hominins contemporary with the emergence of anatomical modernity. A century and a half of investigation in Europe and in the Middle East has resulted in the collection of a large sample, allowing us to study many aspects of the biology and behaviour of these extinct humans. The interest of both the public and the scientific community in Neanderthal studies partly results from these historical circumstances, as well as from a clear Eurocentrism in most palaeoanthropological studies thus far. It also results from the peculiar situation of this human lineage, which likely represents our sister species, i.e. the last diverging branch before the emergence of modem humans. Since the nineteenth century, much discussion of the Neanderthals has focused on their possible relationship with our own species. The goal of this chapter is to explore the extent to which the evolutionary processes at work in our sister group can shed light on or raise additional questions about modern human evolution. In all comparisons between the Neanderthal and the Homo sapiens lineages, it is necessary, however, to keep in mind that for most of their histories, the two groups evolved under quite different environmental conditions. This could have resulted in significant differences with respect to adaptive strategies and population history.

https://www.academia.edu/2284626/Hublin_J_J_2007_What_Can_Neanderthals_Tell_Us_About_Modern_Human_Origins_In_P_Mellars_K_Boyle_O_Bar_Yosef_and_C_Stringer_eds_Rethinking_the_Human_Revolution_McDonald_Institute_Monographs_Cambridge_235_248

ACADEMIA.EDU – Collective knowledge and the dynamics of culture in chimpanzees

Philosophical Transactions of the Royal Society B, 377: 20200321. (2021).

ANDREW WHITEN et al – Collective knowledge and the dynamics of culture in chimpanzees

Social learning in non-human primates has been studied experimentally for over 120 years, yet until the present century this was limited to what one individual learns from a single other. Evidence of group-wide traditions in the wild then highlighted the collective context for social learning, and broader 'diffusion experiments' have since demonstrated transmission at the

community level. In the present article, we describe and set in comparative perspective three strands of our recent research that further explore the collective dimensions of culture and cumulative culture in chimpanzees. First, exposing small communities of chimpanzees to contexts incorporating increasingly challenging, but more rewarding tool use opportunities revealed solutions arising through the combination of different individuals' discoveries, spreading to become shared innovations. The second series of experiments yielded evidence of conformist changes from habitual techniques to alternatives displayed by a unanimous majority of others but implicating a form of quorum decision-making. Third, we found that between-group differences in social tolerance were associated with differential success in developing more complex tool use to exploit an increasingly inaccessible resource. We discuss the implications of this array of findings in the wider context of related studies of humans, other primates and non-primate species. This article is part of a discussion meeting issue 'The emergence of collective knowledge and cumulative culture in animals, humans and machines'.
https://www.academia.edu/91639514/Collective_knowledge_and_the_dynamics_of_culture_in_chimpanzees

NEWS

KINGUISTICS – The Gender Code: Dangerous Gender Marking?

From pronouns to professions, gender codes are all around us. Though often unnoticed, they shape society as it exists today. I've only ever lived in Britain (which shouldn't be mistaken for a lack of awareness of other cultures), so I can't speak on behalf of other societies. However, in the Western world, and especially in Britain, gendered language has come a long way. Within my lifetime, language has evolved significantly, experiencing both growth and setbacks.
https://kinguistics.wordpress.com/?fbclid=PAAabYvx-V0CqfJ3MJDShUVthoM8CsGZ--qFydMGQt-jB0giNjEeXtK0V2CWg_aem_ASJotk6k4at5yIDVTxHlYNmQzvMQQ9NZlgkqHNEJn-H-j1o8K-US7ZrNXKJn2ybHS2E

NATURE BRIEFING – Mice with human gene 'speak' differently

The development of spoken language might have been influenced by a protein variant unique to humans. The NOVA1 protein, which is involved in brain development, differs between humans and animals by a single amino acid. To test the impact of such a small tweak, scientists used CRISPR gene-editing technology to replace the gene that expresses NOVA1 in mice with the version found in humans. The swap made the mice's vocalizations more complex, which could suggest that the variant causes subtle brain changes that affect our ability to communicate.
https://www.nature.com/articles/d41586-025-00518-0

SAPIENS – David Graeber's Lasting Influence on Anthropology and Activism

When activist and anthropologist Graeber died unexpectedly in 2020, scholars gathered to mourn him. Contributors to a resulting volume, As If Already Free, reflect on his legacy.
https://www.sapiens.org/culture/david-graeber-as-if-already-free-anthropology-activism/

SCIENCEADVISER – Mammals and birds took different paths to braininess

Although bird brains look very different from mammalian ones, some bird species are remarkably intelligent—even rivaling the advanced cognitive abilities of great apes. Now, the authors of three new Science studies report that birds and mammals took distinct evolutionary pathways to complex brains.

In both birds and mammals, a part of the brain called the pallium plays a key role in memory, learning, and thinking. In mammals, the pallium includes the neocortex, the layered sheet of cells on the surface of the brain. In birds, it's structured quite differently. Scientists found that, while birds and mammals may have evolved brain circuits with similar functions, these circuits don't form the same way during embryonic development, and the neurons responsible for sensory processing are formed using different sets of genes. " Collectively, these results show that the similarity of neural circuits in birds and mammals is the result of evolutionary convergence, rather than common ancestry," evolutionary biologists Giacomo Gattoni and Maria Antonietta Tosches write in a related Science Perspective. "Evolution has found multiple solutions for building complex brains," Fernando García-Moreno, who serves as a co-author on two of the new studies, explains in a statement. "Birds have developed sophisticated neural circuits through their own mechanisms, without following the same path as mammals."

One of the studies also revealed that neurons in distinct regions in the bird brain are surprisingly similar, even though they originate in different parts of the embryo. As study co-author Henrik Kaessmann notes in a statement, "We need to rethink the idea that a neuron's final role is strictly determined by where it forms in the embryonic brain."
https://www.science.org/doi/10.1126/science.adv2609

SCIENCEADVISER – Terrible teenagers

At a hotel gathering held instead of a workshop at the U.S. National Institutes of Mental Health, researchers compared chimpanzee adolescence to our own.
https://www.science.org/content/article/what-animals-can-teach-us-about-challenges-being-teen

SCIENCEADVISER – An innate drive to save a life

People who witness someone collapse and who subsequently perform cardiopulmonary resuscitation (CPR) report that they intervene because they intuitively understand that the person would otherwise die. Humans are not alone in this instinct. Animals as diverse as elephants [Loxodonta africana and Loxodonta cyclotis], chimpanzees [Pan troglodytes], and dolphins [Tursiops truncatus] can recognize and intervene by touching, nudging, and even carrying an incapacitated individual. Sun et al. and Sun et al., respectively, provide information on the neurobiology underlying this impulse. They report that mice (Mus musculus) have an instinct to revive an unresponsive mouse and identify two distinct brain regions that are crucial for this behavior. These findings add to the evidence that an impulse to help others in states of extreme distress is shared by many species and highlight neural mechanisms that drive instinctive rescue.
https://www.science.org/doi/10.1126/science.adv3731

SCIENCE DAILY – Does planetary evolution favor human-like life? Study ups odds we're not alone

Humanity may not be extraordinary but rather the natural evolutionary outcome for our planet and likely others, according to a new model for how intelligent life developed on Earth.
https://www.sciencedaily.com/releases/2025/02/250214225042.htm

SCIENCE DAILY – Evolution, evolution, evolution: How evolution got so good at evolving

The field of evolution examines how organisms adapt to their environments over generations, but what about the evolution of evolution itself?
https://www.sciencedaily.com/releases/2025/02/250213143940.htm

SCIENCE DAILY – ChatGPT for birdsong may shed light on how language is wired in the human brain

Just like ChatGPT and other generative language models train on human texts to create grammatically correct sentences, a new modeling method trains on recordings of birds to create accurate birdsongs. The results could improve understanding of the structure of birdsong and its underlying neurobiology, which could lend insight in the neural mechanisms of human language.
https://www.sciencedaily.com/releases/2025/02/250212192501.htm

SCIENCE DAILY – Adults can learn absolute pitch: new research challenges long-held musical belief

It's been a long-held belief that absolute pitch -- the ability to identify musical notes without reference -- is a rare gift reserved for a select few with special genetic gifts or those who began musical training in early childhood. However, research challenges this, demonstrating that adults can acquire this skill through rigorous training.
https://www.sciencedaily.com/releases/2025/02/250212134435.htm

SCIENCE DAILY – Like human brains, large language models reason about diverse data in a general way

Researchers find large language models process diverse types of data, like different languages, audio inputs, images, etc., similarly to how humans reason about complex problems. Like humans, LLMs integrate data inputs across modalities in a central hub that processes data in an input-type-agnostic fashion.
https://www.sciencedaily.com/releases/2025/02/250219121241.htm

SCIENCE DAILY – A single protein may have helped shape the emergence of spoken language

How much does the evolution of human speech owe to one amino acid?
https://www.sciencedaily.com/releases/2025/02/250218113813.htm

SCIENCE DAILY – Big birds like emus are technical innovators, study shows

Large birds -- our closest relations to dinosaurs -- are capable of technical innovation, by solving a physical task to gain access to food.
{BREAKING NEWS: Big Bird to sue Sesame Street for misrepresentation.}
https://www.sciencedaily.com/releases/2025/02/250220122510.htm

SCIENCE.ORG NEWS – Silk Road merchants may have introduced cats to China 1400 years ago

Largest ever analysis of feline bones from the country suggests the animals may have been prized exotic pets.
{LATE BREAKING YULETIDE NEWS: Dick Whittington story based on fact!}
https://www.science.org/content/article/silk-road-merchants-may-have-introduced-cats-china-1400-years-ago

SCIENCE.ORG NEWS – 'Eloquent' mice point to protein that may have shaped human speech

Mice modified to have "human" version of a protein made more complex squeaks.

https://www.science.org/content/article/eloquent-mice-point-protein-may-have-shaped-human-speech

PUBLICATIONS

eLife

PAPERS

TIMO VAN KERKOERLE et al with STANISLAS DEHAENE & GHISLAINE DEHAENE-LAMBERTZ – Brain areas for reversible symbolic reference, a potential singularity of the human brain

The emergence of symbolic thinking has been proposed as a dominant cognitive criterion to distinguish humans from other primates during hominisation. Although the proper definition of a symbol has been the subject of much debate, one of its simplest features is bidirectional attachment: the content is accessible from the symbol, and vice versa. Behavioural observations scattered over the past four decades suggest that this criterion might not be met in non-human primates, as they fail to generalise an association learned in one temporal order (A to B) to the reverse order (B to A). Here, we designed an implicit fMRI test to investigate the neural mechanisms of arbitrary audio–visual and visual–visual pairing in monkeys and humans and probe their spontaneous reversibility. After learning a unidirectional association, humans showed surprise signals when this learned association was violated. Crucially, this effect occurred spontaneously in both learned and reversed directions, within an extended network of high-level brain areas, including, but also going beyond, the language network. In monkeys, by contrast, violations of association effects occurred solely in the learned direction and were largely confined to sensory areas. We propose that a human-specific brain network may have evolved the capacity for reversible symbolic reference.
https://elifesciences.org/articles/87380

ELLIOT HOWARD-SPINK et al with SUSANA CARVALHO & CATHERINE HOBAITER – Old age variably impacts chimpanzee engagement and efficiency in stone tool use

We know vanishingly little about how long-lived apes experience senescence in the wild, particularly with respect to their foraging behaviors, which are essential for survival. Some wild apes use tools during foraging and, given the additional cognitive and physical challenges presented by tool use, we predict that such behaviors are at a heightened risk of senescence. However, until the present, longitudinal analysis of the effects of progressive aging on wild ape tool-use behaviors has not been possible due to a lack of available data. In response to this research gap, we sampled data from a longitudinal video archive that contained footage of wild chimpanzees engaging in one of their most complex forms of tool use - the cracking of hard-shelled nuts with hammers and anvil stones, termed nut cracking - at an 'outdoor laboratory' at Bossou, Guinea. By sampling data over a 17-year period, we describe how progressive old age influences the extent to which wild chimpanzees engage with – and efficiently perform – nut cracking. With increasingly old age, chimpanzees began attending experimental nut cracking sites less frequently than younger individuals. Several elderly chimpanzees exhibited reductions in efficiency across multiple components of nut cracking, including taking more time to select stone tools prior to use, and taking longer to crack open nuts and consume the associated pieces of kernel. Two chimpanzees also began using less streamlined behavioral sequences to crack nuts, including a greater number of actions (such as more numerous strikes of the hammer stone). Most notably, we report interindividual variability in the extent to which tool-use behaviors senesced during aging – ranging from small to profound reductions in tool engagement and efficiency – as well as differences in the specific aspects of nut cracking behaviors which senesced for each individual. We discuss the possible causes of these changes with reference to research into senescence in captive primates, and provide future directions for research of primate aging in both captive and wild settings.
https://elifesciences.org/reviewed-preprints/105411

ANA FLÓ et al with GHISLAINE DEHAENE-LAMBERTZ – Statistical learning beyond words in human neonates

Interest in statistical learning in developmental studies stems from the observation that 8-month-olds were able to extract words from a monotone speech stream solely using the transition probabilities (TP) between syllables (Saffran et al., 1996). A simple mechanism was thus part of the human infant's toolbox for discovering regularities in language. Since this seminal study, observations on statistical learning capabilities have multiplied across domains and species, challenging the hypothesis of a dedicated mechanism for language acquisition. Here, we leverage the two dimensions conveyed by speech –speaker identity and phonemes– to examine (1) whether neonates can compute TPs on one dimension despite irrelevant variation on the other and (2) whether the linguistic dimension enjoys an advantage over the voice dimension. In two experiments, we exposed neonates to artificial speech streams constructed by concatenating syllables while recording EEG. The sequence had a statistical structure based either on the phonetic content, while the voices varied randomly (Experiment 1) or on voices with random phonetic content (Experiment 2). After familiarisation, neonates heard isolated duplets adhering, or not, to the structure they were familiarised with. In both experiments, we observed neural entrainment at the frequency of the regularity and distinct Event-Related Potentials (ERP) to correct and incorrect duplets, highlighting the universality of statistical learning mechanisms and suggesting it operates on virtually any dimension the input is factorised. However, only linguistic duplets elicited a specific ERP component, potentially an N400 precursor, suggesting a lexical stage triggered by

phonetic regularities already at birth. These results show that, from birth, multiple input regularities can be processed in parallel and feed different higher-order networks.
https://elifesciences.org/articles/101802

Evolutionary Anthropology

PAPERS

BERNARD WOOD & DANIEL BIGGS – Birth of Paranthropus

Robert Broom, who is best known among vertebrate paleontologists for his research on mammal-like reptiles, was drawn into paleoanthropology because of his defense of Raymond Dart's interpretation of the Taung infant skull. Our contribution documents Robert Broom's background, his life and career, and how he became directly involved with human origins research in South Africa in the second and third decades of the 20thC. It focuses on the circumstances surrounding Broom's interest in what was being recovered at Sterkfontein, how Broom "discovered" the site of Kromdraai, and the fossil evidence that led to his 1938 paper announcing the discovery of a new hominin genus and species, Paranthropus robustus. It also summarizes subsequent discoveries assigned to P. robustus, and developments in interpretations of its evolutionary history. Broom was a complex character who combined remarkably "modern" interpretations of the early hominin fossil record, with decidedly idiosyncratic views about science and evolution, and attitudes to modern human variation that were overtly racist.
https://onlinelibrary.wiley.com/doi/full/10.1002/evan.70000

Frontiers in Developmental Psychology

PAPERS

ISHANTI GANGOPADHYAY & LILLIAN PETERS – The effect of speaker reliability on word learning in children: a replication study

This study aimed to replicate a previously conducted in-person speaker reliability experiment using a fully online methodology. Twenty children aged 4 to 6 years participated in a live video call with the experimenter and completed virtual tasks on a web-based platform. The experimental task mirrored that used in the previous reliability study, where children learned novel words from both a reliable and an unreliable speaker, followed by testing children's novel word retention. Consistent with the prior study's findings, children performed above chance in both conditions and retained novel labels taught by both speakers. These preliminary results suggest that speaker reliability is a robust cue, showing consistent effects across different data collection methods. Thus, online data collection shows promise for producing viable results and improving participation by making research more accessible and flexible. Nonetheless, further studies are necessary to explore its strengths and limitations, especially in the context of research involving children.
https://www.frontiersin.org/journals/developmental-psychology/articles/10.3389/fdpys.2025.1469550/full

Human Nature

PAPERS

YIGUI ZHANG, QIN ZHU & ZHONGQIU LI – The Nature and Motivation of Human Cooperation from Variant Public Goods Games

This study aims to reveal the nature and motivation of human cooperation. By adopting the public goods game paradigm of competition and repetition, and introducing factors such as punishment and heterogeneous contributions, an experiment was conducted at Nanjing University in China, where 224 undergraduate students participated in seven games, including intragroup and intergroup competition. Meanwhile, participants' social value orientation (SVO) was measured. The results indicated that cooperation (non-zero contribution) was the common choice for participants, but their contributions varied across rounds and games. Individuals generally act as conditional free-riders in intragroup competition games, i.e., they use the "small for big" strategy. In contrast, individuals generally act as conditional cooperators in intergroup competitive games, i.e., they use the "tit for tat" strategy. Although SVO should theoretically be related to contribution, analysis revealed that participants' contributions were not significantly dominated by SVO, but were primarily driven by self-interest. Specifically, individuals switch back and forth between conditional cooperators and conditional free-riders to seek maximum self-interest. Our results not only reveal the complexity and strategic nature of human behavior in competitive contexts but also highlight the central role of self-interest in driving individual decision-making, reflecting the balance between individuals' pursuit of self-interest and adaptation to the environment in social interactions.
https://link.springer.com/article/10.1007/s12110-024-09483-5

Nature

NEWS

A human gene makes mice squeak differently — did it contribute to language?

A gene variant present in most people might have contributed to cognitive differences between humans and their closest relatives.
https://www.nature.com/articles/d41586-025-00518-0

Nature Africa

NEWS

Forest chimpanzees and humans have similar genes for malaria resistance
A large study on how chimps adapted to their environments could help research on human diseases.
https://www.nature.com/articles/d44148-025-00040-5

Nature Communications

PAPERS

LOU M. HAUX et al – Chimpanzees adapt their exploration to key properties of the environment
Exploration is an important strategy for reducing the uncertainty that pervades daily life. Yet the evolutionary roots of adaptive exploration are poorly understood. We harness and adapt the human decisions-from-experience paradigm to investigate exploration under uncertainty in chimpanzees. In our study, chimpanzees (N = 15; eight females) are simultaneously confronted with an uncertain option (with outcome variance) and a safe option (without outcome variance) and tested in both stable and changing environments. Results reveal that, as in human exploration, how and how much chimpanzees explore depends on the environment. One key environmental property is change: Chimpanzees explore more across trials in changing than in stable conditions. Consistent with the assumption of classic economic models that variance indicates risk, chimpanzees also explore more when they experience variance in the options' outcomes. Individual risk and uncertainty preferences did not have a statistically significant effect on exploratory efforts. These findings suggest that chimpanzees and humans share key similarities in the way they respond to risk and uncertainty.
https://www.nature.com/articles/s41467-025-57022-2

YOKO TAJIMA et al – A humanized NOVA1 splicing factor alters mouse vocal communications
NOVA1, a neuronal RNA-binding protein expressed in the central nervous system, is essential for survival in mice and normal development in humans. A single amino acid change (I197V) in NOVA1's second RNA binding domain is unique to modern humans. To study its physiological effects, we generated mice carrying the human-specific I197V variant (Nova1hu/hu) and analyzed the molecular and behavioral consequences. While the I197V substitution had minimal impact on NOVA1's RNA binding capacity, it led to specific effects on alternative splicing, and CLIP revealed multiple binding peaks in mouse brain transcripts involved in vocalization. These molecular findings were associated with behavioral differences in vocalization patterns in Nova1hu/hu mice as pups and adults. Our findings suggest that this human-specific NOVA1 substitution may have been part of an ancient evolutionary selective sweep in a common ancestral population of Homo sapiens, possibly contributing to the development of spoken language through differential RNA regulation during brain development.
https://www.nature.com/articles/s41467-025-56579-2

ALESSANDRO URCIUOLI et al – Semicircular canals shed light on bottleneck events in the evolution of the Neanderthal clade
Revealing the evolutionary processes which resulted in the derived morphologies that characterize the Neanderthal clade has been an important task for paleoanthropologists. One critical method to quantify evolutionary changes in the morphology of hominin populations is through evaluating morphological phenotypic diversity (i.e., disparity) in phylogenetically informative bones as a close proxy to neutral evolutionary processes. The goal of this study is to quantify the degree of disparity in the Neanderthal clade. We hypothesize that a reduction in bony labyrinth disparity is indicative of the underlying genetic variation resulting from bottleneck events. We apply a deformation-based geometric morphometric approach to investigate semicircular canal and vestibule shape of a chronologically broad sample of individuals belonging to the Neanderthal lineage. Our results identify a significant reduction in disparity after the start of Marine Isotope Stage 5 supporting our hypothesis of a late bottleneck, possibly leading to the derived morphology of Late Pleistocene Neanderthals.
https://www.nature.com/articles/s41467-025-56155-8

New Scientist

NEWS

Most Europeans may have had dark skin until less than 3000 years ago
Ancient DNA from 348 individuals suggests that pale skin became the predominant characteristic of people living in Europe much later than assumed.
https://www.newscientist.com/article/2467926-most-europeans-may-have-had-dark-skin-until-less-than-3000-years-ago/

ARTICLES

COLIN BARRAS – Why it's so hard to tell when Homo sapiens became a distinct species
The more we discover about our species' family tree, the harder it becomes to pinpoint when exactly Homo sapiens emerged, raising questions over what it really means to be human

https://www.newscientist.com/article/mg26535311-300-why-its-so-hard-to-tell-when-homo-sapiens-became-a-distinct-species/

KATE DOUGLAS – We're uncovering a radically different view of civilisation's origins
The discovery that farming might not have been the catalyst for civilisation means we must completely rethink the timeline of the first complex societies.
https://www.newscientist.com/article/mg26535311-400-were-uncovering-a-radically-different-view-of-civilisations-origins/

PLoS One

PAPERS

SOON YOUNG PARK et al – Examining holistic processing strategies in dogs and humans through gaze behavior
Extensive studies have shown that humans process faces holistically, considering not only individual features but also the relationships among them. Knowing where humans and dogs fixate first and the longest when they view faces is highly informative, because the locations can be used to evaluate whether they use a holistic face processing strategy or not. However, the conclusions reported by previous eye-tracking studies appear inconclusive. To address this, we conducted an experiment with humans and dogs, employing experimental settings and analysis methods that can enable direct cross-species comparisons. Our findings reveal that humans, unlike dogs, preferentially fixated on the central region, surrounded by the inner facial features, for both human and dog faces. This pattern was consistent for initial and sustained fixations over seven seconds, indicating a clear tendency towards holistic processing. Although dogs did not show an initial preference for what to look at, their later fixations may suggest holistic processing when viewing faces of their own species. We discuss various potential factors influencing species differences in our results, as well as differences compared to the results of previous studies.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0317455

PNAS

{Something is not healthy in the World of PNAS. This week's email notification: two articles, one profile, one commentary, three papers, six corrections, one retraction.}

Proceedings of the Royal Society B

PAPERS

CHIARA DE GREGORIO et al – Isochrony in titi monkeys duets: social context as a proximate cause of duets' rhythm and regularity
Music and rhythm are typical features of all human cultures, but their biological origins remain unclear. Recent investigations suggest that rhythmic features of human music are shared with animal vocalizations. Moreover, arousal is known to influence the structure of both human speech and animal sounds. We investigated coppery titi monkeys' (Plecturocebus cupreus) duet rhythms to assess adherence to rhythmic patterns previously observed only in Old World primates and to deepen our understanding of the proximate causes of non-human primate song rhythm. Titis' songs were remarkably isochronous, but their tempo depended on the social context: songs sung during territorial confrontations have a slower pace than during early morning singing. Songs had a faster tempo and were less regular when infants were present, suggesting a speed-accuracy trade-off. Finally, we found that pair-mates perform isochronous songs with the same precision, suggesting that isochrony plays a role in boosting pair coordination, as it does in other singing primates. Our investigation sheds light on the ultimate and proximate causes of primates' isochronous rhythm, to our knowledge confirming its presence for the first time in a New World monkey and highlighting the role of social factors in shaping its timing and regularity in the short term.
https://royalsocietypublishing.org/doi/full/10.1098/rspb.2024.2805

JAMES A. KLAREVAS-IRBY, BRENDAH NYAGUTHII & DAMIEN R. FARINE – Moving as a group imposes constraints on the energetic efficiency of movement
Movement is a key part of life for many species. In solitary animals, the energetic costs of movement can be mitigated through energetically efficient strategies that produce faster, straighter movements. However, little is known about whether moving as part of a collective enhances or limits the ability of individual group members to express such strategies. Drawing on 6 years of population-level, high-resolution (1 Hz) GPS tracking of group-living vulturine guineafowl (Acryllium vulturinum), we detected 886 events from 94 tagged individuals where their groups made large, range-shifting displacements in response to changing environmental conditions. We contrasted these movements with data from 94 similarly large displacement events by 19 lone, dispersing individuals. Our results suggest that individuals in groups can significantly reduce their energetic cost of transport when making large displacements (15.3% more efficient relative to their normal daily ranging) by increasing the speed and straightness of their movements. However, even during their most efficient movements, individuals in groups could not achieve or maintain comparable increases in speed to lone individuals, resulting in significantly limited efficiency gains (35.7% less efficient than solitary individuals). Overall, this study provides evidence for a substantial energetic cost arising from collective movement.

https://royalsocietypublishing.org/doi/full/10.1098/rspb.2024.2760

Science

NEWS

'Eloquent' mice point to protein that may have shaped human speech
Mice modified to have "human" version of a protein made more complex squeaks.
https://www.science.org/content/article/eloquent-mice-point-protein-may-have-shaped-human-speech

What animals can teach us about the challenges of being a teen
Researchers seek common patterns in adolescence, in chimps, elephants, and dolphins.
https://www.science.org/content/article/what-animals-can-teach-us-about-challenges-being-teen

ARTICLES

WILLIAM M. SHEERAN & ZOE R. DONALDSON – An innate drive to save a life
People who witness someone collapse and who subsequently perform cardiopulmonary resuscitation (CPR) report that they intervene because they intuitively understand that the person would otherwise die. Humans are not alone in this instinct. Animals as diverse as elephants [Loxodonta africana and Loxodonta cyclotis], chimpanzees [Pan troglodytes], and dolphins [Tursiops truncatus] can recognize and intervene by touching, nudging, and even carrying an incapacitated individual. On pages 843 and 842 of this issue, Sun et al. and Sun et al., respectively, provide information on the neurobiology underlying this impulse. They report that mice (Mus musculus) have an instinct to revive an unresponsive mouse and identify two distinct brain regions that are crucial for this behavior. These findings add to the evidence that an impulse to help others in states of extreme distress is shared by many species and highlight neural mechanisms that drive instinctive rescue.
https://www.science.org/doi/10.1126/science.adv3731

EDO KUSSELL – A multilevel population architecture enables bacteria to evolve increased adaptability
Evolvability, or the capacity to generate adaptive phenotypic variation, can itself evolve in response to selection. Species that evolve too slowly may be unable to adapt to environmental change and are more likely to go extinct than faster-evolving species. Yet what it takes to get evolvability to evolve, in nature or in the lab, has remained puzzling. For example, many generations might be needed for natural selection to change a species' ability to adapt. Higher evolvability can result in lower heritability, a cornerstone of natural selection's ability to act, and the same degree of evolvability might not suit all traits equally. On page 840 of this issue, Barnett et al. describe how experimental evolution can yield increased evolvability by localized hypermutation in populations of bacteria exposed to an alternating selection regime, akin to the regularly fluctuating conditions that pathogenic bacteria experience moving from one host to another.
https://www.science.org/doi/10.1126/science.adv4087

KRISTIN ANDREWS, JONATHAN BIRCH & JEFF SEBO – Evaluating animal consciousness
Honeybees becoming "pessimistic" after stressful experiences; cuttlefish remembering the past and planning for the future; and cleaner wrasse fish seemingly recognizing themselves in a mirror: If scientific reports like these were accepted as evidence of consciousness, then the implications would be substantial. The neuroscience of consciousness would need to expand its focus beyond humans and other primates and include a much wider range of model species. Animal welfare policies likely would need to expand as well. The outstanding question is whether such reports serve as evidence of consciousness. If so, what conclusions can be drawn about animals that display some consciousness indicators but not others?
https://www.science.org/doi/10.1126/science.adp4990

PAPERS

WENJIAN SUN et al – Reviving-like prosocial behavior in response to unconscious or dead conspecifics in rodents
When humans encounter someone unconscious, they often respond with emergency reactions aimed at reviving that person. However, it remains unclear whether animals naturally exhibit any specific behaviors when faced with an unconscious peer. Anecdotal observations of various animal species in the wild have documented behaviors toward peers that have collapsed as a result of sickness, injury, or death. These behaviors include touching, grooming, nudging, and sometimes even more intense physical actions such as striking. Although these actions toward incapacitated conspecifics are reminiscent of human emergency responses involving intense sensory stimulation, it remains difficult to determine the precise nature of these behaviors, how common they are within a species, and the neural mechanisms behind them. In this study, using laboratory mice under controlled conditions, we examined whether animals naturally display any stereotypic behaviors in response to and directed toward their unresponsive social partners, which would allow us to address the above questions.
Behavioral monitoring combined with a machine learning–based annotator showed that when mice encountered a familiar social partner in a state of unconsciousness caused by anesthesia, they displayed distinct and consistent behaviors toward the partner, escalating from sniffing and grooming to more forceful actions such as biting the partner's mouth or tongue and

pulling its tongue out. The latter intense actions were also observed in mice interacting with a dead familiar partner but were rarely seen when the partner was active or simply sleeping. These behaviors emerged after prolonged immobility and unresponsiveness of the partner and ceased once the partner regained activity, suggesting that they were triggered by observing unresponsive states of others. These behaviors were strongly influenced by familiarity, being more pronounced in familia-r pairs, and were unlikely to have been motivated by a desire for reciprocal social interaction or curiosity about something new. The consequences—including clearance of foreign objects from the mouth, improved airway opening, and hastened recovery—suggest reviving-like efforts. Electrophysiological recordings and microendoscopic calcium imaging showed that oxytocin neurons in the hypothalamic paraventricular nucleus as a population exhibited increased activation in the presence of unconscious, compared with active, familiar partners, suggesting that the activity of these neurons can distinguish between the different partner states. Additionally, increased activity was observed in distinct subpopulations of the oxytocin neurons during specific behavioral actions. Furthermore, optogenetic activation of these neurons promoted reviving-like behaviors, whereas inactivation of them or blocking oxytocin signaling through ventricular administration of oxytocin receptor antagonists impaired the behaviors.

Our study reveals a stereotypic set of behaviors in mice directed toward unresponsive familiar peers that appear to facilitate the regaining of responsiveness. Similar to other prosocial behaviors, these behaviors rely on the oxytocin system, which is essentially conserved across vertebrate species. Our findings thus suggest that animals exhibit reviving-like emergency responses and that assisting unresponsive group members may be an innate behavior widely present among social animals. Such behavior likely plays a role in enhancing group cohesion and survival.

https://www.science.org/doi/10.1126/science.adq2677

FANGMIAO SUN, YE EMILY WU & WEIZHE HONG – A neural basis for prosocial behavior toward unresponsive individuals

The partial or complete loss of responsiveness, such as transient unconsciousness, presents a substantial risk to animals, increasing their vulnerability to predators or hazardous environments. The actions of bystanders toward unresponsive individuals can be critical for enhancing survival and well-being. Humans, for instance, can readily recognize and assist unconscious individuals. Similarly, anecdotal reports suggest that some animal species, including nonhuman primates, marine mammals (e.g., whales and dolphins), and elephants, exhibit behavioral reactions to collapsed or unresponsive conspecifics in the wild. However, it is unclear whether such behaviors occur in species beyond those few that have been documented. Additionally, the nature, characteristics, and consequences of these behaviors have not been systematically examined in a controlled experimental setting. Moreover, the neural mechanisms underlying the perception of others' unresponsive states and the ensuing behaviors remain elusive.

Previous studies have demonstrated that rodents, including mice, can perceive and behaviorally respond to others' negative or needy states. For example, they can display comforting social touch through allogrooming, broadly targeted at various body parts of distressed conspecifics. In addition, they can respond to others' local pain and injury with allolicking behavior focused on the wound site. However, it is unclear how mice react to other animals in an unresponsive state. In this study, we examined the behaviors that mice display toward unresponsive conspecifics, their effects on the recipients, and the neural representation and regulation of these behaviors.

We discovered that mice preferentially approach unresponsive conspecifics over awake ones and engage in distinctive behaviors toward unresponsive conspecifics under deep sedation, characterized by intense contact and grooming directed at the sedated individuals' head region, particularly the facial and mouth areas. These behaviors are observed in both male and female animals and are correlated with the extent of reduction in the responsiveness of the recipients. Physical contact and grooming directed at the head region are more likely to elicit motor responses in the recipients compared with other social behaviors and can expedite the animals' recovery from the unresponsive state.

Moreover, we uncovered an essential role of the medial amygdala (MeA) in regulating this response. MeA neural activity differentiates between awake and sedated conspecifics at both single-cell and population levels, and the neural response to sedated animals does not simply reflect a response to novelty. Optogenetic silencing of MeA γ-aminobutyric acid–producing (GABAergic) neurons suppresses head grooming behavior, whereas their activation promotes this behavior. Although mice respond to sedated, unresponsive conspecifics primarily with head-directed allogrooming and physical contact, their allogrooming response to awake conspecifics experiencing a general state of stress mainly targets other body regions. These two different adverse states and the corresponding behavioral responses (head grooming versus body grooming) are distinguishable by neural activities in the MeA, suggesting that the MeA may be part of the neural circuitry mediating the differentiation between these states.

Our findings reveal that mice exhibit rescue-like behaviors toward unresponsive conspecifics, characterized by intense physical contact directed at the recipient's head region. This response accelerates recovery from unresponsiveness, potentially reducing risks to unresponsive individuals and enhancing their survival. We have also uncovered that the MeA encodes the unresponsive state of others and drives head-directed grooming toward them. Notably, the behavioral response toward unresponsive conspecifics differs from that toward awake, stressed individuals, and these responses are differentially represented in the MeA. These findings shed light on the neural mechanisms underlying prosocial responses toward unresponsive individuals, broadening our understanding of animals' ability to detect and behaviorally react to different adverse conditions of others.

https://www.science.org/doi/10.1126/science.adq2679

MICHAEL BARNETT, LENA MEISTER & PAUL B. RAINEY – Experimental evolution of evolvability

The capacity to generate adaptive variation is critical for long-term evolutionary success. However, the extent to which natural selection directly favors enhanced evolvability remains debated. Although studies with microbes show that mutants with elevated genome-wide mutation rates can be selected, a deeper question persists: Can natural selection structure genetic and developmental systems to bias mutations toward adaptive outcomes? This hypothesis challenges the traditional view of evolution as a "blind" process fueled by random variation, which amplifies traits beneficial in the present without regard for future contingencies.

Mutation being biased toward adaptive outcomes challenges conventional perspectives but aligns with the logic of natural selection acting on lineages. Across changing environments, lineages capable of rapid adaptation are more likely to survive and replace those less able. If competing lineages, because of their varying genetic architecture, tend to generate phenotypic variation in different ways, then those with tendencies that are more conducive to an adaptive response in a given environment will be favored. Provided the same environmental challenges recur over time, an iterative process of selection can take place, potentially refining the capacity to adapt. To test this idea, we designed an experiment where lineages of bacteria competed to repeatedly achieve, through mutation, phenotypes optimal for growth under two alternating conditions. Lineages that failed to evolve the target phenotype within a set time went extinct and were replaced by successful lineages. This birth-death dynamic created conditions for selection to refine the ability of lineages to evolve between phenotypic states.

During the course of a 3-year selection experiment, involving identification and ordering of more than 500 mutations, a lineage emerged that was capable of rapid mutational transitions between alternate phenotypic states through localized hypermutation. The mutable locus arose through a multistep evolutionary process: Initial mutations targeted a wide range of genes but eventually focused on a single regulator. A series of mutations that alternately activated and inactivated function of the regulatory gene then followed. A subset of these inactivating mutations were compensated for by mutations that increased transcription and, concomitantly, frameshift mutation rate. The overall effect was to promote, through slipped-strand mispairing, the duplication, and then further amplification, of a heptanucleotide sequence. This process led the locus-specific mutation rate to increase ~10,000-fold. In turn, the resulting frameshift mutations enabled reversible phenotypic changes through expansion and contraction of the heptanucleotide sequence, mirroring the contingency loci of pathogenic bacteria. Lineages with the hypermutable locus exhibited enhanced evolvability to altered rates of environmental change and were more likely to acquire additional adaptive mutations, highlighting an unanticipated evolutionary advantage of localized hypermutability.

Our study demonstrates how selection can incorporate evolutionary history into the genetic architecture of a single cell, giving rise to a hypermutable locus that appears to anticipate environmental change, thereby accelerating adaptive evolution. This was possible only as an outcome of selection working at two levels. Whereas individual-level selection repeatedly drove cell populations between the same two phenotypic states, the genetic underpinnings of these phenotypes were free to diverge, fueling an exploration of evolutionary potential, the consequences of which only emerged on the timescale of lineages. Ultimately, this exploration generated the variation necessary for construction and cumulative refinement of a lineage-level adaptive trait. More generally, our experiment clarifies the conditions by which evolvability can itself evolve adaptively and highlights the importance of this process for microbial pathogens.

https://www.science.org/doi/10.1126/science.adr2756

Scientific American

ARTICLES

DONNA L. MANEY – This Backyard Bird Has a Lot to Teach Us about Sex Variability

White-throated Sparrows demonstrate that traits we usually associate with sex can be influenced by genes that are not on sex chromosomes.

{"There are more things in heaven and earth, Horatio, Than are dreamt of in your philosophy." (William Shakespeare, Hamlet, 1.5. 165–66)}

https://www.scientificamerican.com/article/a-backyard-bird-offers-a-new-way-of-thinking-about-sexes/

Trends in Cognitive Sciences

PAPERS

NAI DING – Sequence chunking through neural encoding of ordinal positions

Grouping sensory events into chunks is an efficient strategy to integrate information across long sequences such as speech, music, and complex movements. Although chunks can be constructed based on diverse cues (e.g., sensory features, statistical patterns, internal knowledge) recent studies have consistently demonstrated that the chunks constructed by different cues are all tracked by low-frequency neural dynamics. Here, I review evidence that chunking cues drive low-frequency activity in modality-dependent networks, which interact to generate chunk-tracking activity in broad brain areas. Functionally, this work suggests that a core computation underlying sequence chunking may assign each event its ordinal

position within a chunk and that this computation is causally implemented by chunk-tracking neural activity during predictive sequence chunking.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00032-4

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