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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.

NEWS

JOHN TEMPLETON FOUNDATION – The Evolution of the Human Brain

In the very, very big picture, the story of a species can feel ponderous and slow. Over generations, mutations accumulate in our DNA—the code that produces our cells, our organs, and sets the broad patterns of our lives. It's DNA that splits, recombines, and divides to pass down its knowledge—and any mutations that proved either neutral or potentially beneficial—to the next generation.
But on a smaller scale, in the iconic words from Ferris Bueller's Day Off, "Life moves pretty fast." Climates can switch from dry to wet, cold to warm. Food and shelter can appear and disappear, become rare or hyperabundant. Our DNA may have prepared us for some of it, but a set of As, Cs, Ts, and Gs can only reflect our past. It cannot predict our future.
And in the face of species-altering challenges within a single generation or two, DNA hits its limits. What picks up the slack, helping a species adapt and survive? The flexibility could come with epigenetics—the tags and tweaks that control how those genetic instructions become proteins, cells, and finally, organs. Evolution isn't as simple as a change to a genetic letter. Instead, epigenetics might also allow a species to adapt on the fly, by tailoring the expression of already present genes to an ever-changing environment.
Those epigenetic changes could make the differences between whether a species survives and thrives—or whether it disappears.
https://www.templeton.org/news/the-evolution-of-the-human-brain

NATURE BRIEFING – Oldest wooden tools ever found

Wooden objects carrying the marks of carving and use could be the oldest wooden tools ever found. Researchers dated the artefacts, found in what is now Greece, to 430,000 years ago — and suggest they might have been made by early Neanderthals or their ancestors, Homo heidelbergensis. A separate study describes 480,000-old flint-knapping tools made from antler and elephant bone, from what is now the United Kingdom. Organic artefacts are a rare find because they're less likely to endure than stone, and show how "bone and wood were probably more valuable for our ancient ancestors," says archaeologist Thomas Terberger. "Imagine how many tools you can make from a single large bone of an elephant."
https://www.pnas.org/doi/10.1073/pnas.2515479123

NATURE BRIEFING – How technology has changed how we write

A new book by computational linguists Brian Roark, Richard Sproat and Su-Youn Yoon explores how writing systems, from ancient Chinese characters to modern alphabets, shape language, and whether users of ChatGPT can be said to be authors at all. "As Tools of the Scribe reminds us, AI's writing ability can seem almost miraculous," writes author Andrew Robinson in his review. "But this illusion undervalues the genuine miracle that is the mind's ability to read and write."
https://www.nature.com/articles/d41586-026-00245-0

NATURE BRIEFING – Social media can spotlight suspect papers

Posts on social-media platform X (née Twitter) that are critical of scientific research can act as early warning signs of problematic articles. Two separate analyses found that articles that went on to be retracted were more likely to have had at least one critical X post than articles that weren't retracted, and that tweets about a paper that included 'red flag' words, such as fraud or flawed, were also associated with an increased risk of retraction. Post-publication critique can be a useful way to spot suspect papers, but publishers should be cautious of giving undue weight to such discourse, says academic-publishing researcher Hajar Sotudeh, who co-authored one of the studies.
https://www.nature.com/articles/d41586-025-04146-6

NATURE BRIEFING – Survey bots threaten social sciences

Chatbots that impersonate people could corrupt or invalidate the online surveys that power thousands of studies every year, say researchers. The offer of payment for participation can incentivize people to game the system using bots, and researchers have shown that some artificial intelligence models can evade most of the security mechanisms put in place to root out fraud. As bots get more sophisticated, it's time that researchers "start rethinking the way that we have traditionally done survey research", says political scientist Ryan Kennedy.
https://www.nature.com/articles/d41586-026-00221-8

NATURE BRIEFING – This mushroom makes you see tiny people

Unlike other hallucinogenic fungi, the mushroom Lanmaoa asiatica causes strikingly similar visions in people who eat it before it's properly cooked — hordes of tiny people everywhere. Cases of these 'lilliputian hallucinations' have been documented in scientific literature since the 1990s, but researchers only pinned down the species that causes them in 2015. Even with their culprit in hand, scientists are still working to discover what about the mushroom gives rise to the sometimes days-long hallucinations, and why the apparitions are almost always the same.
https://www.bbc.co.uk/future/article/20260121-the-mysterious-mushroom-that-makes-you-see-tiny-people

NEWS FROM SCIENCE – Oldest wooden tools may have been used to butcher elephants

Branches sharpened 400,000 years ago shine light on humans' early toolmaking.
https://www.science.org/content/article/oldest-wooden-tools-may-have-been-used-butcher-elephants

SCIENCEADVISER – Get to the point

"Sharp sticks can do lots of things," archaeologist Larry Barham told Science reporter Andrew Curry. No truer words indeed, Dr. Barham.

For hunter-gatherers living 430,000 years ago in what today is southern Greece, such pointy poles could dig, scrape, and stab—all useful activities when it comes to eking out a living in an ice age. These sticks—discovered during a 2015 excavation—represent the oldest known handheld wooden tools.

The ancient toolkit included a palm-size piece of wood that looked like it had been used to strip bark or shape stone tools, and a longer, 81-centimeter length of wood that showed clear signs it was carved and shaped for use, perhaps as a digging stick or makeshift weapon. These tools were found alongside an elephant carcass, suggesting ancient people used them to help butcher the felled beast or even drive off other predators eager to snipe the meaty prize.

It's unclear which species of early human made these tools—they predate the emergence of our species by 100,000 years or so—so candidates include an ancestor of Neanderthals, Homo heidelbergensis, or another, as-yet-unidentified hominin. But their existence adds to evidence that around 500,000 years ago, humans began to manipulate their environment in unprecedented ways, making fire and creating increasingly sophisticated tools out of different materials. Last week, a different team of scientists described a 480,000-year-old tool made from elephant bone that was used to shape stone hand axes.
https://www.science.org/content/article/oldest-wooden-tools-may-have-been-used-butcher-elephants

SCIENCEADVISER – How much of the human lifespan is measured in genes?

Lots of traits are passed down from parents to offspring, from eye color and height to the likelihood of developing certain diseases. But do a person's genes also determine how long they live? Although scientists have identified some genes that

appear linked to lifespan, environmental factors exert a powerful influence. And while lifespan tends to be quite heritable in other animals, studies investigating the phenomenon in humans have come to wildly different conclusions.
Now, a new analysis combining mathematical models, computer simulations, and data from multiple largescale twin cohorts suggests that the human lifespan is much more heritable than previously thought. Once external causes of mortality like accidents and infectious disease are properly accounted for, scientists report, genetics may explain roughly 50% of how long we live. As aging researchers Daniela Bakula and Morten Scheibye-Knudsen write in a related Science Perspective, the findings might mean "that intrinsic rates of aging are tightly optimized through evolution, in line with other traits such as cognitive function and metabolism."
Other researchers view the results with caution. "Whether there are genes that have some overall regulation of aging that can be targeted to develop treatments to increase our lifespan is moot ," epidemiologist Tony Blakely told the Australian Science Media Centre, noting that the analysis primarily focused on homogenous populations in Denmark and Sweden. "It may be that this study is just a manifestation of the many genetic influences on many diseases, summed up to longevity."
https://www.science.org/doi/10.1126/science.adz1187

SCIENCENEWS – Whaling may have started 1,500 years earlier than already known

Specialized whalebone harpoons from southern Brazil dating back 5,000 years suggest that Indigenous groups in the area were whalers.
https://www.sciencenews.org/article/whaling-brazil-1500-years-earlier

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

CHARLES C. ROSEMAN & BENJAMIN M. AUERBACH – Evolving a Field: Can Evolutionary Theory Provide What the Study of Human Evolution Requires?

The extended evolutionary synthesis (EES) is a school of thought that maintains that genetic determination and natural selection are over-emphasized in the study of evolution at the expense of non-genetic inheritance and processes of evolution beyond selection. Its proponents call for the de-emphasis of genetics and the adoption of a broader model of inheritance that includes cultural and epigenetic transgenerational effects and strong adaptive phenotypic plasticity. Presenting itself as a radical alternative to what it claims is a rigid and ossified theoretical orthodoxy, the EES has lately gained considerable traction among scholars of human evolution, and a distinct sub-branch of the EES unique to the biological anthropological study of human evolution has emerged (the EES in human evolution). To date, however, no direct comparison between the EES in human evolution and other contemporary evolutionary approaches has been attempted to evaluate whether the EES in human evolution affords researchers an edge in articulating good questions and structuring research programs to answer them. After reviewing the landscape of evolutionary theory, we evaluate whether the EES in human evolution is capable of delivering the processually pluralistic vision of evolution it has long promised and whether it brings something that the decades-long ongoing synthesis (OS) of evolutionary theory since the modern synthesis does not. We then conduct a head-to-head comparison to evaluate the relative explanatory efficacy of the EES and our preferred OS theoretical framework on several issues of human morphological evolution. We demonstrate that evolutionary perspectives as drawn from the OS have a much more clarifying effect on the investigation of human evolution than their EES-based competitor. Far from being a radical extension of evolutionary thought, the EES in human evolution offers little more than another idiom in which to tell adaptationist stories and triumphalist narratives of the ascent of humanity. Theory from the OS opens up new horizons of possible investigation of human evolution in a uniquely processually pluralistic and rigorous framework.
https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.70127

ALANNA E. F. RUDZIK – Embodiment and Lived Experience in Human Biology

Lived experience is concerned with the ways that humans experience the world as embodied subjects. Lived experience and embodiment have been of growing interest to biological anthropologists across the subdiscipline. The focus of this article is how human biologists have examined and understand lived experience and embodiment. The article is structured in three sections. The first provides an overview of theories of phenomenology, embodiment, and "the body" from the realms of philosophy, medical anthropology and public health. The second reviews work within human biology that has made use of these theoretical concepts, either implicitly or explicitly. For scholars of human biology attaining statistical power for quantitative analyses of biological data drives an emphasis on larger sample sizes or analysis of decontextualised secondary data. Ethnographic engagement with research participants' lived experience, analyzed in association with biological findings, is rather rare. Particular attention is paid to what has been termed "ethnographic human biology" and to exemplars of this approach. The closing section of the paper presents a call for biological anthropologists to engage with an integrated anthropology, based around theories of embodiment and lived experience, in light of recent advances that have complicated our understanding of evolutionary processes.
https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.70120

ALEXANDRA BREWIS – Stigma as a Core Construct for Biological Anthropology: What It Offers and Why It Matters
Stigma is a term that all biological anthropologists know in passing but likely have not (yet) considered as particularly relevant to their research. The capacity of stigma to control and oppress—with profound biological consequences—cannot be underemphasized. It can completely eliminate an individual's ability to function within society through terrible consequences up to and including "social death," and can be deployed to systematically and effectively marginalize, disenfranchise, and otherwise harm entire groups to the benefit of others. These processes are often insidious and hence highly effective, meaning both identifying and acting against them are very difficult. The goal of this review is to explain why a sophisticated understanding of stigma processes is useful for biological anthropologists. To summarize the argument: stigma is a set of complex processes operating within all human societies. The study of these processes helps us understand and apply wider knowledge about what is both a fundamental cause and consequence of human health and biocultural variation. It also provides analytic frameworks to better understand and interrogate the roles of norms and power in human biology. And with the intentions of using biological anthropology to create a healthier and more equitable world, theorizing, operationalizing, and applying stigma constructs provide a means to reach toward such goals.
https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.70118

DAVID B. WOOD & EDUARDO FERNANDEZ-DUQUE – Task Specialization in Infant Care in Wild Coppery Titi Monkeys (Plecturocebus cupreus)
Cooperative breeding is hypothesized to be central to human life history since it reduces the energetic investment from the mother to her offspring by distributing the energetic cost across multiple caregivers. Biparental care offers a simplified system to examine this hypothesis since maternal care is only modified by the care of one other individual. The Task Specialization Hypothesis posits that, in biparental systems, each parent performs unique tasks with minimal overlap, resulting in the necessity of care from both parents for successful reproduction. While biparental care is rare in mammals, it occurs in some primates; infants are actively cared for by both parents in coppery titi monkeys (Plecturocebus cupreus). Questions remain regarding how mothers and fathers contribute, and to what extent their caring tasks are specialized.
For 13 months, we observed 1300 h of infant care provided by 10 wild coppery titi monkey pairs at Estación Biológica Quebrada Blanco, Peru.
Fathers carried infants 65% of the time while females only carried them 14%. Infants attempted to receive food more often from fathers than mothers (daily rate mean difference = −4.7 attempts) and were more successful at doing so (success rate mean difference = −0.4). Fathers also groomed and played with infants more than mothers did.
Fathers are consistent caregivers to infants and contribute substantially to all caring tasks other than nursing. Our findings show both quantitative and qualitative sex differences in infant care, supporting the Task Specialization Hypothesis.
https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.70194

FAYE S. HARWELL et al – Sex Differences in Estimated Lean Body Mass of Captive and Wild Orangutans
Male and female primates experience different ecological and reproductive constraints, which often lead to differences in how they allocate energy. Since testosterone promotes muscle growth, male primates generally possess greater relative muscle mass than females. Orangutans exhibit a rare phenomenon called male bimaturism, where there are two adult male morphs. Male orangutans reach adulthood as the unflanged morph and may transition to the flanged morph during their lifetime. Here, we investigated muscle mass differences of wild and captive orangutans among the age-sex classes while accounting for flange status.
Estimated lean body mass (ELBM) can be obtained by comparing urinary creatinine (CR) residuals using specific gravity (SG). We analyzed 2329 urine samples collected from 51 orangutans under human care and 279 samples from 29 wild Bornean orangutans at Gunung Palung National Park, Borneo, Indonesia.
In both datasets, flanged males had the greatest mean ELBM followed by females and unflanged males. Flanged males had significantly greater ELBM than adult females and unflanged males in both captive and wild environments.
Flanged males have greater ELBM than unflanged males, suggesting increased energetic investment in muscle mass. Differences in body composition likely reflect the distinctive reproductive strategies and behavioral niches utilized by the two morphs. Flanging is an energetically costly process to undergo and maintain and is associated with a costly reproductive strategy. Because of these sex/morph differences, we recommend indexing urine samples against SG to avoid potential sex biases when indexing with CR.
https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.70173

VICTORIA A. LOCKWOOD et al – A New Experimental Protocol for Assessing Hominoid Assisted Arboreal Bipedalism
Arboreal bipedalism is suggested as a precursor and adaptive locomotor mode for the immediate ancestor of hominin terrestrial bipedalism, yet detailed investigation of its locomotor biomechanics is hindered by its low frequency and observation difficulties in free-ranging hominoids. Further difficulties are faced in the creation and installation of a suitable experimental setup in natural settings. Captive studies may potentially reduce logistical issues, but data on arboreal bipedalism are scarce. We present an experimental design and protocol for collecting video data on arboreal bipedalism in captive primates, from which qualitative and quantitative gait data can be extracted. Our protocol increases the frequency of this rare behavior. Data were collected on six adult chimpanzees (three males, three females) at La Vallée des Singes,

Romagne, France. The chimpanzees voluntarily engaged with a simulated arboreal foraging scenario consisting of two parallel PVC tubes and a high-value food reward. Five GoPro cameras recorded interactions with the experimental equipment. For validation of the effectiveness of our experimental design, protocol interactions were identified as successful (activity completed) or unsuccessful. All age and sex classes had successful interactions. Full strides were observed alongside the identification of two forms of arboreal bipedalism, forward-facing and sideways. This highlights the variation within the arboreal bipedalism locomotor category and the capacity for our experimental design to provide suitable data for gait parameter analysis and interspecies comparisons. Our protocol thus permits detailed investigation of arboreal bipedalism's role in the evolution of hominin bipedalism.
https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.70189

Biology Letters

PAPERS

ANNIKA BOUSSARD et al – Cognitive advantages of large brains persist during an experimental heatwave

Heatwaves negatively impact behaviour with associated cognitive impairment in humans. A growing body of literature also reports negative effects of heatwaves on cognition in other animals. A larger brain is known to generate enhanced cognitive abilities that may buffer against environmental changes and thereby potentially increase fitness in large-brained individuals. How a larger brain buffers against adverse effects on cognitive abilities induced by thermal stress, such as that experienced during heatwaves, remains unknown. We examined detour problem solving and working memory during an experimental heatwave in guppies artificially selected on brain size with matching differences in neuron number. Overall, detour problem-solving was impaired among guppies during the heatwave, while working memory was unaffected. Large-brained guppies outperformed small-brained guppies in detour problem-solving and working memory in both the heatwave and control temperature treatments. During the heatwave, large-brained guppies exhibited cognitive performance levels comparable to those of small-brained guppies under normal temperature conditions in the detour task. Our study thus suggests that small-brained individuals might have lower fitness also during heatwaves if increased temperature impair cognitive abilities required for survival and reproduction. Furthermore, our results open up the possibility that cognition-driven brain size evolution may have been influenced by abiotic factors.
https://royalsocietypublishing.org/rsbl/article/22/1/20250648/479789/Cognitive-advantages-of-large-brains-persist

Cell

PAPERS

YOUNG-HOON NHO et al – Human orbitofrontal neural activity is linked to obsessive-compulsive behavioral dynamics

Biomarkers of obsessive-compulsive disorder (OCD) symptom dynamics and related behavior could advance personalized interventions. Aberrant activity in the orbitofrontal cortex (OFC) has been implicated in symptom exacerbation in OCD. We conducted an intracranial monitoring assay to identify high-resolution neurophysiologic correlates of OCD symptoms in the human OFC. We found that low-gamma power in the anteromedial OFC was consistently elevated during high symptom states in a symptom provocation task. Furthermore, electrical stimulation of the ventral basal ganglia that reduced OCD symptoms also reduced anteromedial OFC gamma power. These results link OFC gamma activity to moment-to-moment expression of OCD symptoms, providing mechanistic insights to guide therapeutic strategies such as deep brain stimulation.
https://www.cell.com/cell/fulltext/S0092-8674(25)01486-2

Frontiers in Artificial Intelligence

PAPERS

ZHIYU LIANG, LEON ON TAY & SIMON DENNIS – Private speech: similarities between a large language model and children

This study investigates the capability of a non-reasoning large language model (GPT-4o) to generate private speech and evaluates its similarity to human private speech. We placed the model in a simulated solitary block-construction scenario via textual prompts, eliciting and classifying its self-directed utterances using an established semantic framework for categorizing private speech in children. The distrib ution of these categories was compared to two human benchmarks: a classic block-construction study and a more recent experiment employing a similar task setting. Analysis using scatter plots and Pearson correlation coefficients revealed a striking pattern: GPT-4o's semantic profile showed negligible similarity to the classic benchmark ($r = 0.01$) but very strong similarity to the recent benchmark ($r = 0.93$). This discrepancy is interpreted as stemming from differences in task nature, namely goal-directed, scaffolded task versus self-determined, unscaffolded play, which exert a stronger influence on speech content than experimental subject difference between GPT-4o and children. In an exploratory serial recall study, we tasked GPT-3.5-Turbo-instruct and observed incidental private speech, indicating that the phenomenon extends across contexts. This provides an avenue for investigating LLM replication of private speech and, potentially, computational consciousness.
https://www.frontiersin.org/journals/artificial-intelligence/articles/10.3389/frai.2026.1691074/full

Frontiers in Human Neuroscience

PAPERS

SUMI KATO & KAZUAKI HANAWA – Lexicogrammatical profiling of ASD: cognitive-functional mapping and diagnostic implications

Previous corpus-based study first established an annotated dataset of autism spectrum disorder (ASD) discourse, and subsequent modeling of lexicogrammatical patterns distinguished ASD from non-ASD discourse with high performance (accuracy 80%, precision 82%, sensitivity 73%, specificity 87%). That line of research further identified 46 statistically significant discriminators, of which 20 were analyzed in detail. The present study examines 18 additional discriminators and situates them within cognitive-functional domains to clarify their diagnostic relevance. Findings refine the language–cognition interface in ASD and extend the utility of lexicogrammatical profiling for assessment.

The Tag Linear Model was employed to identify lexicogrammatical features that distinguish ASD and non-ASD discourse. Logistic regression with 10,000 bootstrap iterations was applied to establish statistical significance. Although DNN models yielded higher predictive accuracy, the linear model provided transparent identification of discriminators.

Of the 135 items analyzed, 46 were confirmed as statistically significant discriminators ($p < 0.05$). Eighteen of these, not previously examined, were analyzed in the present study. The discriminators were mapped onto 12 cognitive-functional domains, including working memory, executive functioning, joint attention, predictive processing, and weak central coherence. The results reveal distinctive patterns across multiple domains, including reduced use of benefactive auxiliaries, relational attributive clauses, obligation modality, evaluative and gradational resources, and mimetic onomatopoeia, reflecting systematic constraints in abstraction, perspective-taking, and pragmatic orientation.

These findings demonstrate that choice patterns of lexicogrammar in ASD reflect domain-specific cognitive constraints. Interpreting the 18 discriminators within 12 cognitive-functional domains provides a linguistically grounded perspective on the neurocognitive profile of ASD and offers implications for future diagnostic and intervention research.

https://www.frontiersin.org/journals/human-neuroscience/articles/10.3389/fnhum.2025.1704950/full

Frontiers in Neuroinformatics

PAPERS

LUKASZ PISZCZEK et al – Computational reconstruction of evolutionary selection in human brain networks

The accumulation of genomic and brain data opens new opportunities for resource friendly, data driven brain exploration. A key challenge is to develop versatile and accessible strategies that integrate and mine multimodal datasets for novel neuroscientific insights. Here, we optimized an integrated workflow for mapping multigenic evolutionary traits in the human brain across cognitive, cellular, and molecular levels.

At the input stage, the workflow fuses an evolutionary genetic dataset with searchable synthetic functional magnetic resonance imaging (fMRI) databases that are pre clustered into concise psychological domains for improved interpretability. At its core, a Genetic Algorithm for Generalized Biclustering (GABi) mines gene sets under evolutionary selection that also show high expression correlation with fMRI networks.

Applying this workflow, we identified evolutionary patterns spanning cognitive traits, brain cell types, and molecular mechanisms. Focusing on socio affective traits, the algorithm highlighted peaks in adaptive selection in networks for social interaction (language) and social concepts (theory of mind) across hominid, early hominin, and anatomically modern human (AMH) ancestry. These traits emerge from a broad spectrum of excitatory (glutamatergic) and inhibitory (GABAergic) neuronal, as well as non neuronal, cell types. The associated Gene Ontology (GO) terms were enriched for cell signaling, synaptic organization, and neuronal morphology.

Together, these findings demonstrate an integrated workflow for molecular to systems level exploration of the brain and provide new perspectives on the evolutionary history of human socio affective functions. This approach can be adapted to screen for functional traits in the context of mental disorders or applied to the brains of other phylogenies in a similar manner.

https://www.frontiersin.org/journals/neuroinformatics/articles/10.3389/fninf.2025.1623174/full

Frontiers in Psychology

PAPERS

OZAN YILMAZ & BETUL BAYAZIT – The effect of motor skills and imagery application on psychomotor development in children

This study aimed to investigate the psychomotor development effect of motor skills and imagery application in 13 year-old boys. The research group consisted of 40 male volunteer children who had 13 studied at Kocaeli/İzmit 29 Ekim Secondary School. The research groups were divided into four groups (control, experiment-1, experiment-2, experiment-3) had 13 with a random method as n=10 children per group. A skill track consisting of eight stations, including fine and gross motor skills, was applied as a data collection tool. Motor skills and imagery programs were applied to the experimental groups 2 days a week for 8 weeks. The control group did not participate in imagery and motor skills exercises. The station scores and track finishing time that constitute the results of the pre- and post-tests of the intervention were recorded. Data analysis was performed using SPSS 21.0. According to the normality test results, the Wilcoxon test, Kruskal–Wallis test, paired samples

test, and one-way ANOVA test were applied. There were statistically significant differences between the study groups in balance, ball transport with racket, target ball throwing, cross hopping, ball driving, shooting, and over the hurdles practice post-test station score averages ($p<0.05$). There were significant differences between the total score on the track and the post-test averages of the track finish time ($p<0.05$). Imagery application studies are important mental processes in the uptake of motor learning and motor development. This research, which will be a reference for future studies, emphasizes the importance of mental preparation and states that the repetitive physical work method is also effective.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1682612/full

Frontiers in Public Health

PAPERS

LOUIS W. FRY et al – The relevance of Spiritual Leadership to public health: values, meaning and purpose

Public health currently faces many enormous challenges that highlight the urgent need for more effective leadership models. This paper explores Spiritual Leadership in the Workplace as a potential approach to informing and animating the field of Public Health Leadership. Developed and applied over the past two decades, Spiritual Leadership is defined as the "values, attitudes, and behaviors necessary both to motivate and inspire workers and to enhance key individual and organizational goals through a vision of service and a culture based on altruism." While for some it can relate to, and build upon, religious practices, Spiritual Leadership more broadly relates to leadership based on personal values and actions emerging from a sense of mission, purpose, and connection to something bigger than oneself. This paper first describes the origin and evolution of Spiritual Leadership and its necessary and organizational development competencies. Then, we conduct a literature review about Public Health Leadership competencies and find that many of them map directly onto the Spiritual Leadership model, thereby opening an opportunity for integration. We also acknowledge both opportunities and challenges for Spiritual Leadership implementation in secular and culturally diverse settings while noting substantial anecdotal indications that many public health leaders already enact Spiritual Leadership-consistent practices. We conclude with a discussion on implications for Public Health Leadership education, workforce development, and research. Spiritual Leadership can serve as a unifying, practice-oriented leadership perspective that can help strengthen purpose, belonging, and resilience in public health organizations.
https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2025.1632959/full

iScience

PAPERS

ROSARIO TOMASELLO et al with FRIEDEMANN PULVERMÜLLER – How Language Modulates Colour Perception In A Brain-Constrained Deep Neural Networks

The linguistic relativity hypothesis suggests that the way we perceive the world is shaped by the language we speak. Evidence comes from colour perception, where Russian speakers, whose language distinguishes between light and dark blue ("goluboj/sinij"), show enhanced discrimination performance for these shades compared to English speakers, who typically use a single term ("blue") for both. To neuromechanistically explain this phenomenon, we built a brain-constrained network simulating neural activity in frontotemporal-occipital cortices. When modelling English speakers' brains, Representational Similarity Analysis revealed similar activity for different shades of blue carrying the same verbal label. However, in virtual Russian speakers, the same colours carrying different labels induced distinct neural activations. These differences arose from microstructural neural changes, shifts in shared and unique neurons encoding colour representations. Functionally distinct colour representations before labelling were modulated by label learning, thereby facilitating or hindering discrimination. The model also reproduced neurophysiological findings, supporting its validity. Together, these findings bridge theoretical, linguistic, cognitive, and neuroscientific accounts of how language modulates perception.
https://www.cell.com/iscience/fulltext/S2589-0042(26)00207-5

Nature

PAPERS

MASSIMO TRUSEL et al – Holistic motor control of zebra finch song syllable sequences

How brain circuits are organized to skillfully produce learned sequences of behaviours is still poorly understood. Here we functionally examined how the cortical song premotor region HVC, which is necessary for zebra finch song1, controls the sequential production of learned song syllables. We found that HVC could generate the complete sequence of learned song syllables independently of its main synaptic input pathways. Thalamic input to HVC was needed for song initiation, but it was not required for transitions between syllables or for song completion. We showed that excitation of HVC neurons during song reliably caused vocalizations to skip back to the beginning of the song, in a manner reminiscent of a skipping record. This restarting of syllable sequences could be induced at any moment of the song and relied on local circuits within HVC. We identified and computationally modelled a synaptic network, including intratelencephalic premotor and corticostriatal neurons within HVC that are essential for completing song syllable sequences. Together, our results show that the learned zebra finch song is controlled by a cortical sequence-generating network in HVC that, once started, can sustain production of

all song syllables independent of major extrinsic input pathways. Thus, sequential neuronal activity can be organized to fuse well-learned vocal motor sequences, ultimately achieving holistic control of this naturally learned behaviour.
https://www.nature.com/articles/s41586-025-10069-z

TIMOTHY G. BROMAGE et al – Palaeometabolomes yield biological and ecological profiles at early human sites
The science of metabolic profiling exploits chemical compound byproducts of metabolism called metabolites that explain internal biological functions, physiological health and disease, and provide evidence of external influences specific to an organism's habitat. Here we assess palaeometabolomes from fossilized mammalian hard tissues as a molecular ecological strategy to provide evidence of an ancient organism's relationship with its environment. From eastern, central and southern African Plio-Pleistocene localities of palaeoanthropological significance, we study six fossils from Olduvai Gorge, Tanzania, one from the Chiwondo Beds, Malawi, and one from Makapansgat, South Africa. We perform endogeneity assessments by analysing palaeometabolomes of palaeosols and the effects of owl digestion on rodent bones to enable prudent ecological inferences. Diagenesis is indicated by metabolites of collagenase-producing bacteria, whereas the preservation of peptides including those of collagen are identified by proteomics. Endogenous metabolites document biological functions and exogenous metabolites render environmental details including soil characteristics and woody cover, and enable annual minimum and maximum rainfall and temperature reconstructions at Olduvai Gorge, supporting the freshwater woodland and grasslands of Olduvai Gorge Bed I and the dry woodlands and marsh of Olduvai Gorge Upper Bed II. All sites denote wetter and/or warmer conditions than today. We infer that metabolites preserved in hard tissues derive from an extravasated vasculature serum filtrate that becomes entombed within developing mineralized matrices, and most probably survive palaeontological timeframes in the nanoscopic 'pool' of structural-bound water that occurs in hard tissue niches.
https://www.nature.com/articles/s41586-025-09843-w

REVIEWS

ANDREW ROBINSON – Technology is changing how we write — and how we think about writing
An exploration of how writing systems, from ancient Chinese characters to modern alphabets, shape language, and whether users of ChatGPT can be said to be authors at all.
Review of 'Tools of the Scribe: How Writing Systems, Technology, and Human Factors Interact to Affect the Act of Writing', by Brian Roark et al., Springer (2025).
https://www.nature.com/articles/d41586-026-00245-0

Nature Africa

ARTICLES

GILBERT NAKWEYA – The Stone Age mind seen through a poisoned arrowhead
Marlize Lombard examines the cognitive leap required to wait for poison to weaken prey, and what that reveals about Middle Stone Age problem-solving.
https://www.nature.com/articles/d44148-026-00009-y

Nature Communications

PAPERS

KAIXI TIAN et al – Domain-specific schema reuse supports flexible learning to learn in the primate brain
We are providing an unedited version of this manuscript to give early access to its findings. Before final publication, the manuscript will undergo further editing. Please note there may be errors present which affect the content, and all legal disclaimers apply.
Prior knowledge accelerates subsequent learning of similarly structured problems – a phenomenon termed learning to learn – by forming generalizable neural representations called neural correlates of schema (NCS). However, how the brain exploits stable NCS while remaining flexible towards changes (the stability-plasticity dilemma) remains unclear. Here, we show that the primate brain addresses this dilemma by representing the stable NCS and task-unique changes in a near-orthogonal manner. We analyzed neural activities in the dorsolateral premotor cortex of three male macaques trained to perform a series of visuomotor mapping tasks. By delineating decision and stimulus-related subspaces, we identified NCS within the decision subspace, whose reuse facilitated subsequent learning. In addition, the decision subspace exhibited a near-orthogonal relationship with the stimulus-related subspace, minimizing cross-domain interference. Our results reveal that restricting NCS to specific functional domains can preserve useful knowledge while maintaining near-orthogonality with other subspaces, enabling flexible adaptation to new environments, thereby resolving the stability-plasticity dilemma.
https://www.nature.com/articles/s41467-026-68692-x

JIAN-PING YUE et al with MICHAEL PETRAGLIA – Technological innovations and hafted technology in central China ~160,000–72,000 years ago
Technological innovations in Africa and western Europe in the later part of the Middle Pleistocene signal the behavioural complexity of hominin populations. Yet, at the same time, it has long been believed that hominin technologies in Eastern Asia

lack signs of innovation and sophistication. Here, we report on technological innovations occurring at Xigou, in the Danjiangkou Reservoir Region, central China, dating to ~160,000–72,000 years ago. Technological, typological, and functional analyses reveal the presence of advanced technological behaviours spanning over a 90,000-year period. The Xigou hominins used core-on-flake and discoid methods to effectively obtain small dimensional flakes to manufacture a diverse range of tool forms. The identification of the hafted tools provides the earliest evidence for composite tools in Eastern Asia, to our knowledge. Technological innovations revealed at Xigou and other contemporary sites in China correspond with increasing evidence for Late Quaternary hominin morphological variability, including larger brain sizes, such as demonstrated at Lingjing (Xuchang) in central China. The complex technological advancements recorded at Xigou indicate that hominins developed adaptive strategies that enhanced their survivability across fluctuating environments of the late Middle Pleistocene and middle Late Pleistocene in Eastern Asia.
https://www.nature.com/articles/s41467-025-67601-y

Nature Human Behaviour

ARTICLES

YNGWIE A. NIELSEN & MORTEN H. CHRISTIANSEN – Priming of non-constituents reveals linguistic structure beyond grammar

It is widely believed that language is structured around 'constituents', units that combine hierarchically. Using structural priming, we provide evidence of linguistic structures — non-constituents — that do not fit into such hierarchies, which reveals a blind spot in current theories of language and grammar.
https://www.nature.com/articles/s41562-025-02388-y

Nature Humanities & Social Sciences Communications

PAPERS

BYUNG-JIK KIM, HARIM SOHN & MIN-JIK KIM – The pro-environmental implications of job insecurity: the significant role of prosocial motivation

We are providing an unedited version of this manuscript to give early access to its findings. Before final publication, the manuscript will undergo further editing. Please note there may be errors present which affect the content, and all legal disclaimers apply.

This study examines how job insecurity, a crucial job characteristic in rapidly changing employment contexts, influences employees' pro-environmental behavior at work (PEBW). Drawing on the Conservation of Resources theory and Social Exchange theory, it proposes that job insecurity exerts an indirect impact on PEBW through employees' affective commitment, with prosocial motivation acting as a moderating factor. Data were collected in three waves from 231 working adults in South Korea, enabling temporal separation of measures and reducing common method bias. Structural equation modeling and bootstrapping analyses revealed that job insecurity alone did not directly predict PEBW; rather, it weakened individuals' affective commitment, which in turn lowered their willingness to engage in green actions. Furthermore, prosocial motivation emerged as a significant buffer, alleviating the detrimental effect of job insecurity on affective commitment. These results point to the critical role of employees' emotional ties to the organization and personal altruistic orientations in shaping ecological behaviors amid perceived employment threats. By integrating multiple theoretical perspectives, the study offers a more holistic explanation of why some employees persist in their environmentally friendly efforts under precarious conditions while others do not. The findings suggest that organizations seeking to foster sustainable practices should carefully manage job insecurity perceptions, reinforce employees' emotional connection to the firm, and nurture prosocial motivations. In so doing, firms may mitigate the negative impacts of workplace uncertainty on discretionary environmental engagement and support a more resilient and sustainable organizational culture.
https://www.nature.com/articles/s41599-026-06526-3

Nature Reviews Biodiversity

ARTICLES

LUKE R. GRINHAM – Same-sex sexual behaviour in nonhuman primates

Same-sex sexual behaviour occurs across the animal kingdom, and is observable in various invertebrate and vertebrate clades. Nonhuman primates are known to exhibit same-sex sexual behaviour more frequently than other mammalian groups. The drivers and origins of this behaviour are poorly understood, and multiple contrasting hypotheses have been posited. Writing in Nature Ecology & Evolution, Coxshall and colleagues identify key social and ecological drivers of same-sex sexual behaviour in nonhuman primates.
https://www.nature.com/articles/s44358-026-00137-1

Neuron

PAPERS

CALEB WEINREB et al – Spontaneous behavior is a succession of self-directed tasks
Animals achieve high-level goals by sequencing low-level actions. This transformation is best understood in structured tasks that impose a specific mapping between goals and actions. However, it remains unclear whether spontaneous behavior is similarly organized in the service of identifiable goals or how it might be supported by brain regions responsible for goal-oriented behavior, such as the prefrontal cortex (PFC). Here, we show that low-level actions in freely exploring mice are hierarchically organized into seconds-long behavioral states that correspond to task-like programs of behavior. These persistent states structure neural activity in the PFC, which preferentially encodes the identity of states relative to low-level behavioral features and shapes which states are expressed in a given context. These findings argue that spontaneous behavior is organized as a succession of self-directed tasks and identify principles of neural control that are common to structured tasks and spontaneous exploration.
https://www.cell.com/neuron/fulltext/S0896-6273(25)00894-3

New Scientist

ARTICLES

KARMELA PADAVIC-CALLAGHAN – We have a new way to explain why we agree on the nature of reality
Quantum Darwinism, an evolution-inspired framework for how quantum fuzziness gives rise to our classical world, shows that even imperfect observers can eventually agree on an objective reality.
https://www.newscientist.com/article/2512894-we-have-a-new-way-to-explain-why-we-agree-on-the-nature-of-reality/

MICHAEL MARSHALL – Ancient humans were seafaring far earlier than we realised
Thousands of years before the invention of compasses or sails, prehistoric peoples crossed oceans to reach remote lands like Malta and Australia. Doing so meant striking out in unknowable conditions. What do such crossings tell us about ancient minds?
https://www.newscientist.com/article/2511681-ancient-humans-were-seafaring-far-earlier-than-we-realised/

MICHAEL MARSHALL – Stick shaped by ancient humans is the oldest known wooden tool
Excavations at an opencast mine in Greece have uncovered two wooden objects more than 400,000 years old that appear to have been fashioned as tools by an unknown species of ancient human.
https://www.newscientist.com/article/2509608-stick-shaped-by-ancient-humans-is-the-oldest-known-wooden-tool/

ALESSIO COZZOLINO – Bubble feeding trick spreads through humpback whale social groups
Humpback whales off the west coast of Canada have learned a cooperative hunting technique from whales migrating into the area, and this cultural knowledge may help the population cope as food becomes scarce.
https://www.newscientist.com/article/2512344-bubble-feeding-trick-spreads-through-humpback-whale-social-groups/

JAMES WOODFORD – Oldest known rock art is a 68,000-year-old hand stencil with claws
Newly discovered rock art sites in Sulawesi, Indonesia, that date to nearly 68,000 years ago are thought to be the oldest rock art in the world, pre-dating Neanderthal hand stencils in Spain by 1100 years.
https://www.newscientist.com/article/2512357-oldest-known-rock-art-is-a-68000-year-old-hand-stencil-with-claws/

MICHAEL MARSHALL – Ape-like hominin Paranthropus was more adaptable than we thought
A fossil discovery in northern Ethiopia expands the known range of Paranthropus, a genus of strong-jawed hominins that lived around 2 million years ago, and suggests they lived in a range of habitats.
https://www.newscientist.com/article/2512373-ape-like-hominin-paranthropus-was-more-adaptable-than-we-thought/

PeerJ

PAPERS

JULIANA WALLNER WERNECK MENDES et al – Pet dogs prefer to work alone than to engage in a challenging cooperative task with conspecifics
Understanding the role of a partner is key to effective human cooperation. While we know that non-human animals extensively cooperate with each other, how well they understand the role of their partner is unclear. This has been explored using economic games, yielding mixed results. A previous study showed that dogs understand the role of their human partner in an economic game setting, adjusting their behavior according to the partner's choices, but there are no clear results when it comes to dog conspecific cooperation. In this study, we tested pairs of pet dogs in the stag hunt game. In the typical payoff group, dogs had the option to perform a more challenging, cooperative action for a higher reward or work individually for a lower one. To test for a potential effect of motivation for the high value reward, we had a same reward

group where cooperation or individual work led to the same reward. Dogs had minimal training and exposure to the contingencies of the game. Dog pairs from both groups only coordinated their choice on the cooperative action in 5% of the trials. Accordingly, we found that dogs were generally more likely to work individually, regardless of their partner's actions and obtainable rewards. In the typical payoff group, dogs initially showed a greater tendency to cooperate during the first session, but this declined quickly, with dogs from pairs ultimately working alone. The low success on the cooperative apparatus was likely due to dogs not investing sufficient effort to find the solution by trial-and-error. This could be due to the fact that the high-quality reward was not good enough to invest that extra effort or a preference of dogs to work alone if given the choice. Overall, our results showed that dogs did not choose to cooperate with conspecifics, in contrast to their demonstrated success in interspecific contexts. We discuss how cooperation is potentially sensitive to contextual and social constraints rather than widespread.
https://peerj.com/articles/20609/

PLoS One

PAPERS

WAKAYO MATTINGLEY et al – Exploring the role of meaning in non-Māori speakers' 'proto-lexicon'

Previous work has demonstrated that New Zealanders who do not speak Māori but are regularly exposed to the language develop implicit knowledge of it. The core of this knowledge, it has been argued, is the 'proto-lexicon'—a set of stored word-forms, without associated meaning, which yields subsequent Māori phonotactic and morphological knowledge. Previous research shows that having a proto-lexicon gives learners a head start in learning Māori word meanings in formal education. We investigate experimentally whether the proto-lexicon confers an advantage for attaching meanings to words. In Experiment 1, non-Māori-speaking New Zealanders were tested on their ability to identify meanings of Māori words in a forced-choice definition task, and they did this relatively well. Then, words with low accuracy were selected for Experiment 2, where non-Māori-speaking New Zealanders and non-New Zealanders were asked to learn meanings for Māori words and nonwords. New Zealanders performed better, indicating that familiarity with Māori word shapes confers an advantage. However, they showed no greater advantage for real words over nonwords. If these words are definitely in the proto-lexicon, then this would suggest that knowledge of individual word-forms does not, in fact, confer an advantage. In Experiment 3, we therefore explore whether the words in Experiment 2 are actually robustly in the participants' proto-lexicon, by running a word identification task with the same participants. These words were not robustly distinguished from nonwords. By selecting words for their lack of semantic knowledge, we also inadvertently selected words that do not appear to be in the proto-lexicon. Together, our results indicate that different levels of semantic knowledge exist for different words, even when we consider only words that cannot confidently be said to be in a full lexicon. The results suggest that the claim of previous studies that the proto-lexicon is 'without semantics' may be oversimplified.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0339325

AARON Y. WONG et al – Human movement patterns predict task-unrelated thought

The cognitive phenomenon, known as task-unrelated thought, reflects the attention shift of one's mind away from the task at hand. Evidence suggests that task-unrelated thought occurs in 30–50% of people's waking time. Previous research using the metronome response task shows that task-unrelated thought is related to variability in response time magnitude. However, those studies did not account for the time varying characteristics of an individual's tapping behavior. In the current study, three research questions were investigated: (1) What is the relationship between task-unrelated thought and movement dynamics (finger tapping dynamics)? (2) How does the statistical structure of external stimuli influence task-unrelated thought? (3) Does this structure moderate the relationship between task-unrelated thought and finger tapping dynamics? Participants performed the metronome response task under four different metronome structures: NoTone, Persistent, Periodic, and Random. Participants synchronized their finger to the metronome tone for each condition and self-reported the occurrence of task-unrelated thought. Overall, an increase of the Hurst exponent resulted in a decrease of task-unrelated thought probability. The findings have implications that behavioral variability has value in detecting task-unrelated thought. Additionally, studies using the metronome response task should account for the impact of the tone structure being used. Future research is warranted in this field to truly understand the mechanism behind task-unrelated thought and its link to human movement variability.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0341902

KATHARINA EHRET – Contact and complexity in English varieties: The influence of speaker numbers on syntheticity and grammaticity

Empirical research on language complexity has shown that languages and varieties can and do differ in their complexity. One of the key triggers responsible for this observed variation is language contact as non-native acquisition. The influence of language contact on complexity is, however, not uncontroversial: While a number of large-scale typological studies have reported that language contact decreases complexity, others find no such effect in their data. This paper offers a corpus-based perspective on the influence of language contact on morphosyntactic complexity in an English-varieties context. Precisely, I model the effect of the number of native speakers, the proportion of non-native speakers and language type–a theoretical construct based on the sociolinguistic contact history of the varieties–in a corpus database of 25 spoken English

varieties. Morphosyntactic complexity is here operationalised as the number of bound grammatical markers (syntheticity) and the total number of explicit grammatical markers (grammaticity). The models show that the number of native speakers negatively correlates with syntheticity. However, contrary to theoretical expectations, the proportion of non-native speakers shows a weak positive effect on syntheticity. None of the speaker-related triggers influences grammaticity. Only language type shows a consistent negative effect on both syntheticity and grammaticity indicating that historic language contact scenarios do impact complexity. The crucial question, then, is what (non-)native speaker numbers really represent and if they are a (good) proxy for language contact. Overall, the results corroborate the controversial findings in the typological literature highlighting the importance of how complexity is operationalised.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0341167

NOREEN VON CRAMON-TAUBADEL et al – Is the human chin a spandrel? Insights from an evolutionary analysis of ape craniomandibular form

Humans are unique among primates in possessing a chin, yet it is currently unclear whether the form of the symphyseal region of the mandible where the chin is located is the product of direct selection or a by-product of evolutionary pressures on other craniomandibular features. Here, we conduct an evolutionary analysis of hominoid craniomandibular traits to test three hypotheses: symphyseal mandibular traits evolved (1) neutrally due to genetic drift, (2) under direct selection, and (3) as a by-product (or "spandrel") of selection on other craniomandibular traits. Evolutionary rates of morphological change, via Lande's generalized genetic distance, were estimated along each branch of a fully-resolved hominoid phylogeny to reveal patterns of neutral, stabilizing and directional selection. Directional selection was detected along the branch between humans and the last common ancestor of chimpanzees and humans, against a backdrop of pervasive stabilizing selection and neutral evolution in hominoids. Significant directional selection was found on cranial traits reflecting increased basicranial flexion, neurocranial expansion, and reduction in lower facial prognathism, and on mandibular traits that generate a more parabolic-shaped, gracile mandible with a smaller ramus and shallower corpus. In contrast, of the nine mandibular "chin" traits, only three were under significant direct selection, while the other six were either under no selection or indirect selection. Thus, the results are consistent with the hypothesis that the symphyseal morphology that forms the human chin evolved largely as a by-product (i.e., spandrel) of direct selection for reduced anterior dental size and the craniofacial changes correlated with the evolution of bipedalism in hominins, rather than as a specific adaptation.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0340278

MONICA TAMARIZ et al – Cultural transmission of attitudes and behaviours from parents, peers and grandparents

This study investigates how attitudes and behaviours are transmitted across generations and social networks, focusing on the relative influence of parents, grandparents, and peers. Building on the influential work of Cavalli-Sforza and Feldman (1982), we aimed to disentangle vertical and horizontal pathways of cultural transmission and assess their contribution to the stability and variation of cultural traits in a contemporary population. We conducted a large-scale survey involving 1905 university students in Australia and 4000 of their parents, grandparents, and friends. Participants reported their attitudes and behaviours across domains such as religiosity, politics, environmentalism, health, and leisure. Responses were analysed using factor analysis, path modelling, correlational analysis, and simulations based on additive transmission models. Our results show that cultural resemblance is strongest for religiosity, political orientation, environmentalism, and health behaviours. These traits exhibited clear vertical transmission from parents to children, with additional indirect influence from grandparents. Peer similarity was also evident, suggesting horizontal transmission and/or peer selection. Traits such as media use, music, and reading habits showed weaker familial resemblance and appeared more influenced by non-familial or contextual factors. Simulations confirmed that cultural traits are more likely to be adopted when shared by both parents and peers, though for some traits (especially left-wing political views and non-religiosity) external influences predominated. The findings demonstrate that cultural transmission is domain-specific and shaped by both family structure and social networks. Vertical and horizontal pathways contribute jointly, but their strength varies by trait. These results underscore the importance of integrating biological, psychological, and sociocultural factors to understand the persistence and evolution of beliefs and behaviours over generations.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0341433

Proceedings of the Prehistoric Society

PAPERS

KEZIAH WARBURTON et al with PONTUS SKOGLUND – Farthest North: Human Remains from Heaning Wood Bone Cave, Cumbria, UK and their European context

The results of research on the human remains and artefacts recently discovered at Heaning Wood Bone Cave, Cumbria, UK are reported. A programme of radiocarbon dating has established that the human remains include the earliest so far discovered in northern Britain, the 'Ossick Lass', which date between 9290 and 8925 cal BC. The cave was used for burial during three phases in prehistory: one individual dating to the Early Mesolithic, four to the Early Neolithic and two to the Early Bronze Age and is thus an important addition to our developing knowledge about the deposition of human remains in caves in north-west Europe at these dates. Genomic analysis has established that all but one of the sampled individuals were biologically female. Osteological and taphonomic analysis shows that, in each phase, the burial practice seems to have been

successive inhumation of the recently deceased body into the vertical entrance of the cave. Artefacts associated with the burials include perforated periwinkle shell beads radiocarbon dated to the Early Mesolithic, a small assemblage of worked stone, including diagnostically Early Neolithic pieces, and sherds of Early Bronze Age Collared Urn pottery.
https://www.cambridge.org/core/journals/proceedings-of-the-prehistoric-society/article/farthest-north-human-remains-from-heaning-wood-bone-cave-cumbria-uk-and-their-european-context/3F163365E901870EF93F78E6BA634A17

JONATHON GRAHAM, MIK MARKHAM & DAVID FIELD – From outcrops to axeheads: determining the source of Group XX stone tool material in Charnwood Forest, Leicestershire

The source of material for Group XX stone artefacts is reassessed using extant geological and petrological information and complemented with new field and artefact pXRF analyses. Our reassessment of extant archaeological and petrological data supports earlier conclusions that a possible origin for Group XX stone tools is in the Charnwood Forest area, just north of Leicester. Based on petrographic evidence, this source is now considered to lie within the geological Bradgate Formation. This formation is exposed in a broad, U-shaped band around the eastern and southern fringes of Charnwood Forest where the Ediacaran volcanic tuff rocks form rugged exposures penetrating the overlying Triassic sandstones and mudstones. A new study of Group XX artefacts at museums in Cambridge, Leicester, Lincoln, and Sheffield revealed a number of distinct morphologies, two of which lead us to suggest that they represent axehead templates that are likely to have derived from specific design and manufacturing, rather than from ad-hoc extraction or loose material selection and random shaping. New pXRF data are used to supplement existing information and similarities in immobile large ion lithophile and high field strength element concentrations between both artefacts and exposures, presenting the possibility that the immediate area near the Windmill Hill exposure of the Bradgate Formation, at Woodhouse Eaves, is close to, or indeed contains the source of, Group XX material.
https://www.cambridge.org/core/journals/proceedings-of-the-prehistoric-society/article/from-outcrops-to-axeheads-determining-the-source-of-group-xx-stone-tool-material-in-charnwood-forest-leicestershire/1C009AA1522129CFC3229EA623BA438A

Proceedings of the Royal Society B

PAPERS

JOYCE F. BENENSON, SOPHIA C. SCOTT & OWEN O'CONNOR – Young children exhibit sex-biased strategies to obtain resources

Mammalian males' strategies for obtaining resources have been well-established and typically depend on direct contests that produce hierarchies. Although less well-documented, current evidence suggests that in female philopatric communities, females engage in contests often with coalition partners who are typically female kin. When kin are not present, however, females of similar age appear more egalitarian and tend to avoid contests. To examine whether phylogenetically similar sex-biased strategies to obtain valuable resources occur in humans, we held a contest for 50 pairs of unrelated, familiar 3–7-year-old children from diverse backgrounds. We show that the majority of female pairs spontaneously approached the resources side-by-side, then briefly competed to obtain the resources. In marked contrast, in over half of the male pairs, one male deferred to his partner, who then gained unimpeded access to the most valuable resource. Sex-differentiated strategies, however, appeared only with same-sex peers. Results show that already by early childhood, humans exhibit sex-biased strategies to regulate competition between same-sex peers. Sex-segregated peer groups, however, mean that by adulthood, each sex has practised strikingly different strategies for obtaining resources from same-sex peers.
https://royalsocietypublishing.org/rspb/article-abstract/293/2063/20252558/479739/Young-children-exhibit-sex-biased-strategies-to

JONATHAN S. REEVES et al – Modern stone tool users from northern Kenya emphasize mass and edge length in the selection of cutting tools

The production and use of informal flake cutting tools played an essential role in foraging across human history. While much is known about the production of these tools, the attributes that facilitate their selection and use remain underexplored. This is because there remain few opportunities for the use of such tools in a traditional setting. The Daasanach of East Turkana, Kenya, maintain a tradition of stone tool production and use, affording the opportunity to investigate tool selection in a natural setting. Through interview and video documentation, we observed eight expert toolmakers complete butchery tasks, allowing us to link traditional technological knowledge governing cutting tool selection with measurable lithic attributes. Our findings reveal that factors such as edge angle, mass and grip significantly influence tool selection and cutting efficiency. These insights provide new perspectives on the functional relevance of informal cutting tools that are largely understood through experimentation. The outcomes of this study provide a venue for interpreting lithic variability in ancient contexts from the perspectives of traditional expert tool users. This research underscores the utility of detailed ethnographic studies to complement archaeological findings, enhancing our understanding of early human technological evolution.
https://royalsocietypublishing.org/rspb/article/293/2063/20251371/479751/Modern-stone-tool-users-from-northern-Kenya

Royal Society Open Science

PAPERS

ANDREA MELTZER et al – Siberian jays help conspecifics in distress regardless of social familiarity

Helping behaviour has evolved across taxa and contexts, and shows considerable variation between individuals. While the role of kinship in modulating helping is established, recent studies highlight the importance of social bonds between actors and recipients. Theoretical and empirical work in humans and other animals shows that stronger social bonds can increase the likelihood of helping. Here, we assessed the role of social bond strength in wild Siberian jays (Perisoreus infaustus). Using playbacks of distress calls, we investigated whether individuals responded more strongly to calls from those with whom they shared stronger bonds. We exposed focal individuals to distress calls from a group member and an unfamiliar individual, alongside controls. Focal individuals responded strongly by approaching the speaker and vocalizing, including producing distress calls. Although individuals modulate responses based on caller identity in other contexts, they responded similarly to distress calls from group members and unfamiliar birds, and responses did not vary with bond strength. This indiscriminate response to distress calls suggests that Siberian jays either cannot differentiate individuals based on distress calls, or respond regardless of their relationship with the distressed bird. We discuss how indiscriminate responses can be adaptive in a social bird under high predation pressure.
https://royalsocietypublishing.org/rsos/article/13/1/250960/479785/Siberian-jays-help-conspecifics-in-distress

KATHREEN E. RUCKSTUHL, SEBASTIAN SOSA & TIM CLUTTON-BROCK – Associations between lifetime fitness and social bonds in female red deer

Social connections affect important components of fitness above and beyond environmental or morphological effects. In some primates and carnivores, females live in stable groups, supporting each other in competitive interactions and breeding within their birth groups. Social status and breeding success are linked to close social connections. However, it is unclear how important social bonds are in open membership fission–fusion societies. Recent work suggests that the strength of social bonds and the centrality of individuals within groups in these types of societies might be equally beneficial and important as in closed-membership groups, influencing population dynamics on par with morphological or environmental effects. Using social network analysis, we studied free-ranging adult female red deer (Cervus elaphus) on the Isle of Rum, confirming that they preferentially associate with relatives while forming open groups. It turned out that the strength of close social bonds in female red deer is a vital fitness correlate. Females' lifetime breeding success and lifetime reproductive success positively correlated with the strength of their associations, as did female survival. Although home range overlap, matriline size and spatial measures were included in models of social network measures and fitness, the strength of social bonds was more crucial for fitness than spatial variables, except for calf survival, which was not linked to the strengths of associations between females. This study suggests that social bonds among female red deer are essential for reproductive success and survival, highlighting the importance of social network analysis in understanding fitness correlates in species with open group structures.
https://royalsocietypublishing.org/rsos/article/13/1/251129/479787/Associations-between-lifetime-fitness-and-social

KEIJI OTA et al – Freedom through understanding: instructed knowledge shapes voluntary action choices

The capacity for voluntary action is a distinctive feature of human minds. However, experimental studies of volition struggled to capture the defining features of human voluntariness. Here we developed a competitive game that incentivized participants to innovate their action choices to find the right time to avoid a collision with an opponent who predicted the timing of the participant's action choice. One group of participants was explicitly instructed that the competitor would monitor the participant's action choices, while a second group had no information about the competitor. Both groups showed increased behavioural stochasticity when adapting to a competitor who punished participants' choice biases. However, the group that had no explicit information avoided the action that the competitor was likely to take. In contrast, the group that explicitly knew the competitor's action-selection rules avoided the same action they took in preceding trials so that the competitor could not easily exploit the participant's behavioural patterns. These findings suggest that people can voluntarily develop beliefs about how the other agent thinks the participant's behaviour and can adapt voluntary action choices accordingly. However, developing this socialized aspect of volition requires instructed knowledge about the other agent—it does not arise spontaneously through trial-and-error alone.
https://royalsocietypublishing.org/rsos/article/13/1/250845/479815/Freedom-through-understanding-instructed-knowledge

Science

ARTICLES

PETER M. TODD & THOMAS T. HILLS – Should I stay or should I go with them?

Social forces underpin human foraging.
https://www.science.org/doi/10.1126/science.aee3786

DANIELA BAKULA & MORTEN SCHEIBYE-KNUDSEN – Rethinking the heritability of aging

The genetic contribution to human longevity is greater than previously thought.

https://www.science.org/doi/10.1126/science.aee3844

PAPERS

ALEXANDER SCHAKOWSKI et al – High-precision tracking of human foragers reveals adaptive social information use in the wild

Successful foraging (i.e., locating and extracting resources) is critical for the survival of every organism. The complexity of the human foraging niche poses distinctive challenges that likely contributed to the evolution of memory, navigational abilities, and social learning skills. Humans have mastered diverse foraging styles in extreme habitats, from the hot tropics to the cold Arctic, ranging from tuber digging, to mushroom and berry picking, to hunting and fishing. In most of these examples, humans forage together with others. Foraging decisions (such as where to go and when to leave) are, therefore, likely influenced by social information. Previous field studies on human foraging decisions have focused on individual-level behavior and the acquisition of personal information (e.g., through sampling the environment). How such personal information is integrated with social information (e.g., obtained by observing others) has rarely been studied in natural foraging contexts.

In this work, we report results from multiple ice fishing competitions in Finland. Ice fishing is an important foraging tradition in the Nordic countries and is practiced competitively in the modern era. During competitions, groups of ice fishers forage on the same lake for the highest catch return, which demands physical strength (e.g., relocating long distances through deep snow), endurance in harsh weather conditions, skilled use of specialized tools, and the ability to form mental representations of the resource distribution while closely monitoring the behavior of others. Such competitions thus provide an opportunity for large-scale field experimentation to study how humans integrate personal and social information when competing for resources in a highly specialized foraging environment. We equipped large groups of ice fishers on different lakes with high-resolution Global Positioning System (GPS) tracking devices and headcams to study how they decide where to go and how long to stay at a foraging location before moving to a new spot. We collected data of 477 foraging trips, made by 74 individuals, and a total of more than 16,000 individual decisions.

Using computational modeling, we find that the social context is an important source of information for deciding where to go: Ice fishers go to areas where other individuals are fishing. This social information is integrated with their own catching success: When ice fishers catch fish, they move to nearby areas, but they move further away when not catching any fish. Social information was less important for the decision when to leave a spot compared with personal information on catching success. This suggests adaptive, context-dependent mechanisms of social and personal information integration that are systematically linked to the requirements of each task.

Social foraging decisions are typically studied in artificial laboratory settings, which provides detailed insight into the social learning strategies that are at play. How such findings translate to natural contexts is unknown. This study aims to close this gap by providing insights into the mechanisms that guide social information integration in a real-world setting.

https://www.science.org/doi/10.1126/science.ady1055

BEN SHENHAR et al – Heritability of intrinsic human life span is about 50% when confounding factors are addressed

How heritable is human life span? If genetic heritability is high, longevity genes can reveal aging mechanisms and inform medicine and public health. However, current estimates of heritability are low—twin studies show heritability of only 20 to 25%, and recent large pedigree studies suggest it is as low as 6%. Here we show that these estimates are confounded by extrinsic mortality—deaths caused by extrinsic factors such as accidents or infections. We use mathematical modeling and analyses of twin cohorts raised together and apart to correct for this factor, revealing that heritability of human life span due to intrinsic mortality is above 50%. Such high heritability is similar to that of most other complex human traits and to life-span heritability in other species.

https://www.science.org/doi/10.1126/science.adz1187

Trends in Cognitive Sciences

PAPERS

MANUEL BOHN & MARISA CASILLAS – Language learning as ontogenetic adaptation

Language learning is a multi-threaded, multi-mechanism process. It is multi-threaded in that it emerges as a byproduct of addressing multiple goals while engaging in social interactions. It is multi-mechanism in that children integrate multiple information sources to infer what is meant and what to say next. These information sources include contextual and social cues, as well as cognitive mechanisms. Focusing on early word learning, this article reviews information sources, how children might sensitively adapt to them, and how we can model their integration using Bayesian inference over multiple probability distributions. We argue that, to advance our understanding of language learning, we must jointly study how children learn from multiple information sources across diverse developmental settings.

https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00354-7

Trends in Ecology and Evolution

PAPERS

LEILA MEYER et al – Taxonomic uncertainty: causes, consequences, and metrics

Taxonomic uncertainty is prevalent across many biological groups. Yet, it remains overlooked in ecology, evolution, and conservation, leading to potential misinterpretations of biodiversity patterns. Here, we argue that this uncertainty emerges from the interaction between biological processes shaping natural lineages and human efforts to name and classify them. Based on this, we propose a set of metrics to quantify confidence in species boundaries and to track the history of taxonomic change and stability. We show how these metrics can be embedded into biodiversity analyses, from mapping uncertainty across taxa and geographic regions to assigning weights to species and deriving more realistic error ranges in ecological models. Making taxonomic uncertainty explicit advances biodiversity science and strengthens conservation decisions.
https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(25)00356-8

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