

EAORC BULLETIN 1,067 – 26 November 2023

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NOTICES

PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.

If there is a journal you feel I should be tracking on a regular basis, let me know.

And if you have any other ideas for extending the “EAORC experience”, please contact me.

EDITORIAL INTERJECTIONS

Comments in curly brackets are editorial interjections. The Editor reserves the right to be wrong.

ACADEMIA.EDU – Fully symbolic sapiens behaviour

In C. Stringer & P. Mellars (eds.), Rethinking the Human Revolution. Cambridge, University Press, 123-132 (2007).

CHRISTOPHER S. HENSHILWOOD – Fully symbolic sapiens behaviour: Innovation in the Middle Stone Age at Blombos Cave, South Africa

‘Modern’ human behaviour, better termed ‘fully symbolic sapiens behaviour’ (Henshilwood & Marean 2003, 644) first evolved in Africa prior to 75 kya, a development that is likely closely linked to the emergence of anatomically modern Homo sapiens at c. 200kya (White et al. 2003; McDougall et al. 2005). Eighteen years ago at the Cambridge Human Revolution conference this statement could not have been made with any certainty. At the time Europe seemed to offer the best evidence for the origins of ‘symbolic sapiens’ (cf. Mellars & Stringer 1989) or at best a late African development was mooted (Klein 1989). New archaeological evidence from Africa has since dispelled, for some at least, the misconception that this continent could not have been the birthplace for ‘symbolic sapiens’ — the forerunners of the ‘symbolic revolution’ that is archaeologically so visible in post 40 kya Europe.

https://www.academia.edu/18801657/Henshilwood_C_S_2007_Fully_symbolic_sapiens_behaviour_Innovation_in_the_Middle_Stone_Age_at_Blombos_Cave_South_Africa_In_Rethinking_the_Human_Revolution_New_Behavioural_and_Biological_Perspectives_on_the_Origins_and_Dispersal_of_Modern_Humans_edcs_C_Stringer_and_P_Mellars_MacDonald_In

LECTURE ALERT – A Mind for Language Webinar

Tuesday November 28th, 16:00 - 17:00 GMT / 11:00-12:00 EST / 8:00-9:00 PST

Join Harry van der Hulst for a webinar about his new textbook, *A Mind for Language: An Introduction to the Innateness Debate*. Harry will be introducing his book and taking your questions!

Harry van der Hulst is Professor of Linguistics at the University of Connecticut. He has been Editor-in-Chief of *The Linguistic Review* since 1990.

A Mind for Language, recently published in September 2023, provides a complete introduction to one of the most fundamental questions about what it means to be human: how does human language arise in the mind?

You can submit your questions in advance to highereducation@cambridge.org or ask your questions in the chat during the event.

Click to Register: https://cambridge-org.zoom.us/webinar/register/5716982646651/WN_qWtDg9NyQFKePP2E-TqfVA#/registration

Can't make the event?

Don't worry, if you register to attend, a recording will be circulated via email afterwards. If you have any questions, please email us at highereducation@cambridge.org.

A Mind for Language: An Introduction to the Innateness Debate. Harry van der Hulst, University of Connecticut:

<https://www.cambridge.org/highereducation/books/a-mind-for-language/805E093B55D6C51CD9F29C7D800EFAF0#overview>

NEWS

GUARDIAN SCIENCE – Where did they all go? How Homo sapiens became the last human species left

At least nine hominin species once roamed the Earth, so what became of our vanished ancestors?

<https://www.theguardian.com/science/2023/nov/18/where-did-other-human-species-go-vanished-ancestors-homo-sapiens-neanderthals-denisovans>

SAPIENS – The Neanderthal Diet—From Teeth to Guts

Neanderthals' tooth enamel, torsos, and even fossilized poop reveal that they ate much more than meat.

<https://www.sapiens.org/biology/neanderthal-diet/>

SAPIENS – It's Official: Neanderthals Created Art

New evidence from caves in Spain shows that Neanderthals engaged in complex symbolic thought—and were pretty good artists to boot.

<https://www.sapiens.org/archaeology/neanderthal-art-discovery/>

SAPIENS – Imagining the Neanderthal's World

In *Kindred*, an archaeologist urges readers to rethink a long-maligned member of humanity's family tree.

<https://www.sapiens.org/archaeology/kindred-neanderthal-book/>

SCIENCEADVISER – The food that helped us pronounce the word 'food'

If you could travel back in time thousands of years and listen to people of the time talk, you wouldn't hear many 'f's or 'v's. That's because those consonants, known as labiodentals, weren't so easy to say. To make them, a person needs to touch their upper teeth to their lower lip. But at the time, the top and bottom teeth in adults met on an even plane, meaning to pronounce the word food, these ancient people would have had to awkwardly push their upper jaws out a bit.

A switch to softer foods, courtesy of the advent of agriculture, led to changes in tooth wear, which ultimately resulted in overbites that make these sounds about 29% easier to say. And that helped spur the diversification of languages in Europe and Asia, researchers say.

<https://www.science.org/content/article/ancient-switch-soft-food-gave-us-overbite-and-ability-pronounce-f-s-and-v-s>

SCIENCE.ORG NEWS – As scientists face a flood of papers, AI developers aim to help

New tools show promise, but technical and legal barriers may hinder widespread use.

<https://www.science.org/content/article/scientists-face-flood-papers-ai-developers-aim-help>

THE CONVERSATION – Discovery of half-a-million-year-old wooden structure

Experts speculated that very early humans worked wood, but previously didn't have the evidence.

<https://theconversation.com/discovery-of-half-a-million-year-old-wooden-structure-shows-were-wrong-to-underestimate-our-ancient-relatives-214732>

OTHER NEWS – BIG THINK – The strange persistence of first languages

When a childhood language decays, so does the ability to reach far back into your own private history. Language is memory's receptacle. It has Proustian powers. Just as smells are known to trigger vivid memories of past experiences, language is so entangled with our experiences that inhabiting a specific language helps surface submerged events or interactions that are associated with it.

<https://bigthink.com/neuropsych/first-languages/>

PUBLICATIONS

Current Biology

ARTICLES

AARON P. RAGSDALE – Human evolution: Neanderthal footprints in African genomes

Human and Neanderthal populations met and mixed on multiple occasions over evolutionary time, resulting in the exchange of genetic material. New genomic analyses of diverse African populations reveal a history of bidirectional gene flow and selection acting on introgressed alleles.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)01363-5](https://www.cell.com/current-biology/fulltext/S0960-9822(23)01363-5)

KATIE J. HARRINGTON et al – Innovative problem solving by wild falcons

Innovation (i.e., a new solution to a familiar problem, or applying an existing behavior to a novel problem) plays a fundamental role in species' ecology and evolution. It can be a useful measure for cross-group comparisons of behavioral and cognitive flexibility and a proxy for general intelligence. Among birds, experimental studies of innovation (and cognition more generally) are largely from captive corvids and parrots, though we lack serious models for avian technical intelligence outside these taxa. Striated caracaras (*Phalcoboenus australis*) are Falconiformes, sister clade to parrots and passerines, and those endemic to the Falkland Islands (Malvinas) show curiosity and neophilia similar to notoriously neophilic kea parrots and face similar socio-ecological pressures to corvids and parrots. We tested wild striated caracaras as a new avian model for technical cognition and innovation using a field-applicable 8-task comparative paradigm (adapted from Rössler et al. and Auersperg et al.). The setup allowed us to assess behavior, rate, and flexibility of problem solving over repeated exposure in a natural setting. Like other generalist species with low neophobia, we predicted caracaras to demonstrate a haptic approach to solving tasks, flexibly switching to new, unsolved problems and improving their performance over time. Striated caracaras

performed comparably to tool-using parrots, nearly reaching ceiling levels of innovation in few trials, repeatedly and flexibly solving tasks, and rapidly learning. We attribute our findings to the birds' ecology, including geographic restriction, resource unpredictability, and opportunistic generalism, and encourage future work investigating their cognitive abilities in the wild.
[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)01462-8](https://www.cell.com/current-biology/fulltext/S0960-9822(23)01462-8)

eLife

PAPERS

TAMAR R. MAKIN & JOHN W. KRAKAUER – Against cortical reorganisation

Neurological insults, such as congenital blindness, deafness, amputation, and stroke, often result in surprising and impressive behavioural changes. Cortical reorganisation, which refers to preserved brain tissue taking on a new functional role, is often invoked to account for these behavioural changes. Here, we revisit many of the classical animal and patient cortical remapping studies that spawned this notion of reorganisation. We highlight empirical, methodological, and conceptual problems that call this notion into doubt. We argue that appeal to the idea of reorganisation is attributable in part to the way that cortical maps are empirically derived. Specifically, cortical maps are often defined based on oversimplified assumptions of 'winner-takes-all', which in turn leads to an erroneous interpretation of what it means when these maps appear to change. Conceptually, remapping is interpreted as a circuit receiving novel input and processing it in a way unrelated to its original function. This implies that neurons are either pluripotent enough to change what they are tuned to or that a circuit can change what it computes. Instead of reorganisation, we argue that remapping is more likely to occur due to potentiation of pre-existing architecture that already has the requisite representational and computational capacity pre-injury. This architecture can be facilitated via Hebbian and homeostatic plasticity mechanisms. Crucially, our revised framework proposes that opportunities for functional change are constrained throughout the lifespan by the underlying structural 'blueprint'. At no period, including early in development, does the cortex offer structural opportunities for functional pluripotency. We conclude that reorganisation as a distinct form of cortical plasticity, ubiquitously evoked with words such as 'take-over' and 'rewiring', does not exist.

<https://elifesciences.org/articles/84716>

ANNICK FN TANGUAY et al – The shared and unique neural correlates of personal semantic, general semantic, and episodic memory

One of the most common distinctions in long-term memory is that between semantic (i.e., general world knowledge) and episodic (i.e., recollection of contextually specific events from one's past). However, emerging cognitive neuroscience data suggest a surprisingly large overlap between the neural correlates of semantic and episodic memory. Moreover, personal semantic memories (i.e., knowledge about the self and one's life) have been studied little and do not easily fit into the standard semantic-episodic dichotomy. Here, we used fMRI to record brain activity while 48 participants verified statements concerning general facts, autobiographical facts, repeated events, and unique events. In multivariate analysis, all four types of memory involved activity within a common network bilaterally (e.g., frontal pole, paracingulate gyrus, medial frontal cortex, middle/superior temporal gyrus, precuneus, posterior cingulate, angular gyrus) and some areas of the medial temporal lobe. Yet the four memory types differentially engaged this network, increasing in activity from general to autobiographical facts, from autobiographical facts to repeated events, and from repeated to unique events. Our data are compatible with a component process model, in which declarative memory types rely on different weightings of the same elementary processes, such as perceptual imagery, spatial features, and self-reflection.

<https://elifesciences.org/articles/83645>

Evolutionary Anthropology

PAPERS

MICHAEL J. O'BRIEN et al – Punctuated equilibrium at 50: Anything there for evolutionary anthropology? Yes; definitely

The theory of punctuated equilibrium (PE) was developed a little over 50 years ago to explain long-term, large-scale appearance and disappearance of species in the fossil record. A theory designed specifically for that purpose cannot be expected, out of the box, to be directly applicable to biocultural evolution, but in revised form, PE offers a promising approach to incorporating not only a wealth of recent empirical research on genetic, linguistic, and technological evolution but also large databases that document human biological and cultural diversity across time and space. Here we isolate the fundamental components of PE and propose which pieces, when reassembled or renamed, can be highly useful in evolutionary anthropology, especially as humanity faces abrupt ecological challenges on an increasingly larger scale.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.22009>

Frontiers in Ecology and Evolution

PAPERS

JAAP P. P. SAERS – Skeletal indicators of developmental changes in arboreality and locomotor maturation in extant apes and their relevance to hominin paleobiology

Modern humans are the only fully terrestrial ape. All other apes are partially arboreal, particularly as infants and juveniles. Precocial locomotor development, high frequency of arboreal locomotion in early ontogeny, and increased terrestriality throughout development are ubiquitous amongst the hominines and likely represent the ancestral state. The role of climbing in hominin evolution has been debated for decades, but if hominins climbed regularly then subadults likely relied on it most frequently. Investigating the role of climbing throughout hominin evolution requires reliable developmentally plastic traits that are responsive to locomotor loading and can be identified in the fossil record. Chimpanzees and gorillas provide a natural experiment to examine the relationship between age-related variation locomotor activities and bone structure. Chimpanzees and gorillas are most arboreal during infancy and become more terrestrial throughout development. Gorillas are comparatively more terrestrial and transition to predominantly terrestrial locomotion at an earlier age. This paper has two main objectives. First, to examine if interspecific differences in the rate of locomotor development is reflected in bone structure. Second, to determine if ontogenetic reductions in the frequency of arboreal locomotion correspond to age-related variation in bone structure.

The humerus, tibia, calcaneus, and seventh cervical vertebrae of an ontogenetic series of gorillas and chimpanzees from the Powell Cotton Museum (n = 71) were uCT scanned. Trabecular, cortical, and total bone volume fraction (BV/TV) were calculated in developmentally homologous regions of interest.

BV/TV scales with positive allometry throughout ontogeny. The achievement of adult-like locomotor behaviour can be identified by a significant change in the slope of Total.BV/TV with age. Younger, more arboreal individuals have relatively greater upper limb Total.BV/TV relative to the neck and lower limb than older, more terrestrial individuals in gorillas and chimpanzees. More arboreal chimpanzees have relatively more Total.BV/TV in the upper limb relative to the lower limb and neck.

The correspondence between developmental trajectories of BV/TV and locomotor ontogeny in extant apes suggests that analyses of hominin skeletal ontogeny can provide new insights into the evolution of two characteristic human traits: our slow rate of maturation and the evolution of fully terrestrial bipedalism.

<https://www.frontiersin.org/articles/10.3389/fevo.2023.1274762/full>

Frontiers in Psychology

PAPERS

HADI KHALILIA et al – Lexical diversity in kinship across languages and dialects

Languages are known to describe the world in diverse ways. Across lexicons, diversity is pervasive, appearing through phenomena such as lexical gaps and untranslatability. However, in computational resources, such as multilingual lexical databases, diversity is hardly ever represented. In this paper, we introduce a method to enrich computational lexicons with content relating to linguistic diversity. The method is verified through two large-scale case studies on kinship terminology, a domain known to be diverse across languages and cultures: one case study deals with seven Arabic dialects, while the other one with three Indonesian languages. Our results, made available as browseable and downloadable computational resources, extend prior linguistics research on kinship terminology, and provide insight into the extent of diversity even within linguistically and culturally close communities.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1229697/full>

FELICITAS EHLEN et al – Linguistic findings in persons with schizophrenia—a review of the current literature

Alterations of verbalized thought occur frequently in psychotic disorders. We characterize linguistic findings in individuals with schizophrenia based on the current literature, including findings relevant for differential and early diagnosis.

Review of literature published via PubMed search between January 2010 and May 2022.

A total of 143 articles were included. In persons with schizophrenia, language-related alterations can occur at all linguistic levels. Differentiating from findings in persons with affective disorders, typical symptoms in those with schizophrenia mainly include so-called “poverty of speech,” reduced word and sentence production, impaired processing of complex syntax, pragmatic language deficits as well as reduced semantic verbal fluency. At the at-risk state, “poverty of content,” pragmatic difficulties and reduced verbal fluency could be of predictive value.

The current results support multilevel alterations of the language system in persons with schizophrenia. Creative expressions of psychotic experiences are frequently found but are not in the focus of this review. Clinical examinations of linguistic alterations can support differential diagnostics and early detection. Computational methods (Natural Language Processing) may improve the precision of corresponding diagnostics. The relations between language-related and other symptoms can improve diagnostics.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1287706/full>

Frontiers in Public Health

PAPERS

JUN LI et al – Family caregiver's willingness to care from the perspective of altruism

The willingness of family members to take care of older relatives directly affects the quality of life of disabled older adults, so it is necessary to understand the status quo of willingness to care and its influencing factors. This has been extensively studied in other countries, but, it is rarely studied in China. Based on the theory of altruism, employing a unique sample from Shanghai, China in 2017 and 2022, we attempt to reveal the influencing factors of the care willingness of family caregivers during the transition period.

To measure caregiver burden and functional disability of the care recipient, we employ the Zarit Burden Interview (ZBI) and the Barthel Index, respectively. Then we utilized the ordinary least squares (OLS) methodology and estimated four regression models. Models 1, 2, and 3 examined the impact of the variables of the caregiver burden, responsibility and love, and the quality of the caregiver-caregiver recipient relationship, respectively, on family caregivers' willingness to care. Model 4 was the full model. To testify whether the caregiver burden is likely to act as a mediator, path analysis was used, and the path was adjusted and verified.

According to the survey, in Shanghai, only half of the caregivers had a very high care willingness to care for disabled older relatives, while nearly one-tenth of the caregivers had a low willingness. It was the caregiver burden rather than the functional disability of older adults that harms family caregivers' willingness to care. Responsibility and caring out of love were positively related to care willingness. Relationship quality was the most important influencing factor, explaining 10.2% of the variance in care willingness. Path analysis demonstrated that responsibility, caring out of love, and relationship quality directly and through the mediation of caregiver burden indirectly affected care willingness.

Our results revealed that reciprocal altruism presented by the quality of the caregiver-care recipient relationship had a significantly positive impact on family caregivers' willingness to care. In addition, the caregiver burden was found not only directly affected care willingness, but also acted as a mediator. To promote the perfection of laws and policies, comprehensive samples of different types of cities should be included and the measurement of key variables could be further improved in future studies.

<https://www.frontiersin.org/articles/10.3389/fpubh.2023.1237241/full>

iScience

PAPERS

EDWIN J.C. VAN LEEUWEN et al with ZANNA CLAY – Group-specific expressions of co-feeding tolerance in bonobos and chimpanzees preclude dichotomous species generalizations

Bonobos are typically portrayed as more socially tolerant than chimpanzees, yet the current evidence supporting such a species-level categorization is equivocal. Here, we used validated group-level co-feeding assays to systematically test expressions of social tolerance in sixteen groups of zoo- and sanctuary-housed bonobos and chimpanzees. We found that co-feeding tolerance substantially overlaps between the species, thus precluding categorical inference at the species level. Instead, marked differences were observed between groups, with some bonobo communities exhibiting higher social tolerance than chimpanzee communities, and vice versa. Moreover, considerable intergroup variation was found within species living in the same environment, which attests to Pan's behavioural flexibility. Lastly, chimpanzees showed more tolerance in male-skewed communities, whereas bonobos responded less pronounced to sex-ratio variation. We conclude that the pervasive dichotomy between the tolerant bonobo and the belligerent chimpanzee requires quantitative nuance, and that accurate phylogenetic tracing of (human) social behaviour warrants estimations of intraspecific group variation.

[https://www.cell.com/iscience/fulltext/S2589-0042\(23\)02605-6](https://www.cell.com/iscience/fulltext/S2589-0042(23)02605-6)

Journal of Linguistics

PAPERS

WOLFRAM HINZEN & MARTINA WILTSCHKO – Modelling non-specific linguistic variation in cognitive disorders

Clinical linguistic diversity extends far beyond 'specific language' disorders, such as acquired aphasia or specific language impairment (SLI), to a large range of mental disorders that are not language-specific. As cognitive impairments are involved in the latter, models with an integrated approach to language and cognition can be useful for understanding and classifying the variation in question. The aim of this paper is to specify such a model, called the Bridge model, which views linguistic cognition as resting on two partially pre-linguistic pillars: (i) perceptual categorisation and (ii) social-communicative interaction. Grammar acting as a bridge crossing between them mediates the lexicalisation of perceptual categories and, based on these, new forms of social interaction and communication conveying thought structured by grammar. This model allows to conceptualise mental disorders as different ways in which this integrated linguistic-cognitive phenotype can deviate from its normal course. We illustrate our general model for the specific instance of language variation within autism spectrum disorder (ASD).

<https://www.cambridge.org/core/journals/journal-of-linguistics/article/modelling-nonspecific-linguistic-variation-in-cognitive-disorders/E4965D9BCB831AA3D20E69FBC22CE060>

MARTIN HASPELMATH – Explaining grammatical coding asymmetries: Form–frequency correspondences and predictability

This paper claims that a wide variety of grammatical coding asymmetries can be explained as adaptations to the language users' needs, in terms of frequency of use, predictability and coding efficiency. I claim that all grammatical oppositions involving a minimal meaning difference and a significant frequency difference are reflected in a universal coding asymmetry, i.e. a cross-linguistic pattern in which the less frequent member of the opposition gets special coding, unless the coding is uniformly explicit or uniformly zero. I give 25 examples of pairs of construction types, from a substantial range of grammatical domains. For some of them, the existing evidence from the world's languages and from corpus counts is already strong, while for others, I know of no counterevidence and I make readily testable claims. I also discuss how the functional-adaptive forces operate in language change, and I discuss a number of possible alternative explanations.

<https://www.cambridge.org/core/journals/journal-of-linguistics/article/explaining-grammatical-coding-asymmetries-formfrequency-correspondences-and-predictability/420965EC1CEA49527CCE7276B33A14D0>

Language Sciences**PAPERS****CATHERINE READ – The practice of metaphor in conversation: an ecological integrational approach**

In this study an integrational linguistic approach to metaphor is used in the context of an ecological psychology study of novel metaphor creation by adults in a structured conversation setting. This paper forms an example of the proposed complementarity of integrational linguistics (Harris, 1981) and ecological psychology (Gibson, 1979; Jones and Read, 2023) by providing a study of novel metaphor that eschews the traditional “coded carrier of message” assumptions about language, as well as the traditional “knowledge is mental representation” assumptions of representationalist cognitive psychology.

Instead, novel metaphor is presented as the sine qua non of the creation of signs in the process of communication, and that creation is proposed to be founded on the perception of invariants across different naturally occurring kinds of objects and events (cf., Read & Szokolszky, 2016). The practice of metaphor is taken as a special case of perceptually guided kinematic semiology. This study describes the practice of metaphor by adults in a structured experimental situation designed to present metaphoric resemblance and to encourage the practice of metaphor with guiding verbal instructions. Such a study allows explication of the integrational method as applied to structured conversational settings. Although the conversation and context were designed to draw attention to metaphoric resemblance and to encourage verbal metaphor, not everyone practiced metaphor, showing that the practice is not determined by context. When metaphor was created, the form often mirrored the perceptual invariants available to the perceiver, i.e., motion or stationary resemblances. No one created exactly the same metaphor even in this consistent context, which emphasizes the creative aspect of metaphor as a prototype of sign creation, with its core properties of novelty, enhanced interest and noticeableness. I make the following central points: communicating by creating and integrating signs is the foundation of language; metaphor is the prototype of the creation of signs, the creation of novel metaphor in conversation is a practice that enhances communication, even in structured experimental settings; and conversation can be studied as the ongoing process of sign integration, that is, as perceptually guided kinematic semiology. The current study shows that metaphor as a practice in conversation is closely coordinated with the perception of metaphoric resemblance and the request to talk about objects and events that are alike metaphorically. Finally, it is argued that direct perception is the best approach on which to found an account of metaphor in communication.

<https://www.sciencedirect.com/science/article/pii/S0388000123000530>

Mind & Language**PAPERS****STEFFEN KOCH – How words matter: A psycholinguistic argument for meaning revision**

Linguistic interventions aim to change our linguistic practices. A commonly discussed type of linguistic intervention is meaning revision, which seeks to associate existing words with new or revised meanings. But why does retaining old words matter so much? Why not instead introduce new words to express the newly defined meanings? Drawing on relevant psycholinguistic research, this paper develops an empirically motivated, general, and practically useful pro tanto reason to retain rather than replace the original word during the process of conceptual improvement.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12494>

Nature Communications**PAPERS****JURAJ BERGMAN et al with RASMUS Ø. PEDERSEN – Worldwide Late Pleistocene and Early Holocene population declines in extant megafauna are associated with Homo sapiens expansion rather than climate change**

The worldwide extinction of megafauna during the Late Pleistocene and Early Holocene is evident from the fossil record, with dominant theories suggesting a climate, human or combined impact cause. Consequently, two disparate scenarios are possible for the surviving megafauna during this time period - they could have declined due to similar pressures, or increased in population size due to reductions in competition or other biotic pressures. We therefore infer population histories of 139 extant megafauna species using genomic data which reveal population declines in 91% of species throughout the Quaternary

period, with larger species experiencing the strongest decreases. Declines become ubiquitous 32–76 kya across all landmasses, a pattern better explained by worldwide *Homo sapiens* expansion than by changes in climate. We estimate that, in consequence, total megafauna abundance, biomass, and energy turnover decreased by 92–95% over the past 50,000 years, implying major human-driven ecosystem restructuring at a global scale.

<https://www.nature.com/articles/s41467-023-43426-5>

Nature Communications Biology

PAPERS

KATHERINE L. BRYANT, CHRISTI HANSEN & ERIN E. HECHT – Fermentation technology as a driver of human brain expansion

Brain tissue is metabolically expensive. Consequently, the evolution of humans' large brains must have occurred via concomitant shifts in energy expenditure and intake. Proposed mechanisms include dietary shifts such as cooking. Importantly, though, any new food source must have been exploitable by hominids with brains a third the size of modern humans'. Here, we propose the initial metabolic trigger of hominid brain expansion was the consumption of externally fermented foods. We define "external fermentation" as occurring outside the body, as opposed to the internal fermentation in the gut. External fermentation could increase the bioavailability of macro- and micronutrients while reducing digestive energy expenditure and is supported by the relative reduction of the human colon. We discuss the explanatory power of our hypothesis and survey external fermentation practices across human cultures to demonstrate its viability across a range of environments and food sources. We close with suggestions for empirical tests.

<https://www.nature.com/articles/s42003-023-05517-3>

Nature Communications Earth & Environment

PAPERS

CARLI PETERS, et al – Bone collagen from subtropical Australia is preserved for more than 50,000 years

Ancient protein studies have demonstrated their utility for looking at a wide range of evolutionary and historical questions. The majority of palaeoproteomics studies to date have been restricted to high latitudes with relatively temperate environments. A better understanding of protein preservation at lower latitudes is critical for disentangling the mechanisms involved in the deep-time survival of ancient proteins, and for broadening the geographical applicability of palaeoproteomics. In this study, we aim to assess the level of collagen preservation in the Australian fossil record. Collagen preservation was systematically examined using a combination of thermal age estimates, Fourier Transform Infrared Spectroscopy, Zooarchaeology by Mass Spectrometry, and protein deamidation calculations. We reveal unexpected subtropical survival of collagen in bones more than 50 thousand years old, showing that protein preservation can exceed chemical predictions of collagen survival in bone. These findings challenge preconceptions concerning the suitability of palaeoproteomics in subtropical Pleistocene environments. We explore potential causes of this unexpected result to identify the underlying mechanisms leading to this exceptional preservation. This study serves as a starting point for the analysis of ancient proteins in other (sub)tropical contexts, and at deeper timescales.

<https://www.nature.com/articles/s43247-023-01114-8>

Nature Human Behaviour

ARTICLES

ANTHONY CHERO – LLMs differ from human cognition because they are not embodied

Large language models (LLMs) are impressive technological creations but they cannot replace all scientific theories of cognition. A science of cognition must focus on humans as embodied, social animals who are embedded in material, cultural and technological contexts.

<https://www.nature.com/articles/s41562-023-01723-5>

MICHAEL C. FRANK – Openly accessible LLMs can help us to understand human cognition

Large language models can be construed as 'cognitive models', scientific artefacts that help us to understand the human mind. If made openly accessible, they may provide a valuable model system for studying the emergence of language, reasoning and other uniquely human behaviours.

<https://www.nature.com/articles/s41562-023-01732-4>

Nature Reviews Neuroscience

PAPERS

JENELLE L. WALLACE & ALEX A. POLLEN – Human neuronal maturation comes of age: cellular mechanisms and species differences

The delayed and prolonged postmitotic maturation of human neurons, compared with neurons from other species, may contribute to human-specific cognitive abilities and neurological disorders. Here we review the mechanisms of neuronal

maturation, applying lessons from model systems to understand the specific features of protracted human cortical maturation and species differences. We cover cell-intrinsic features of neuronal maturation, including transcriptional, epigenetic and metabolic mechanisms, as well as cell-extrinsic features, including the roles of activity and synapses, the actions of glial cells and the contribution of the extracellular matrix. We discuss evidence for species differences in biochemical reaction rates, the proposed existence of an epigenetic maturation clock and the contributions of both general and modular mechanisms to species-specific maturation timing. Finally, we suggest approaches to measure, improve and accelerate the maturation of human neurons in culture, examine crosstalk and interactions among these different aspects of maturation and propose conceptual models to guide future studies.

<https://www.nature.com/articles/s41583-023-00760-3>

Nature Scientific Reports

PAPERS

ALEXANDER STOESEL et al – Auditory thresholds compatible with optimal speech reception likely evolved before the human-chimpanzee split

The anatomy of the auditory region of fossil hominins may shed light on the emergence of human spoken language. Humans differ from other great apes in several features of the external, middle and inner ear (e.g., short external ear canal, small tympanic membrane, large oval window). However, the functional implications of these differences remain poorly understood as comparative audiometric data from great apes are scarce and conflicting. Here, we measure the sound transfer function of the external and middle ears of humans, chimpanzees and bonobos, using laser-Doppler vibrometry and finite element analysis. This sound transfer function affects auditory thresholds, which relate to speech reception thresholds in humans. Unexpectedly we find that external and middle ears of chimpanzees and bonobos transfer sound better than human ones in the frequency range of spoken language. Our results suggest that auditory thresholds of the last common ancestor of Homo and Pan were already compatible with speech reception as observed in humans. Therefore, it seems unlikely that the morphological evolution observed in the bony auditory region of fossil hominins was driven by the emergence of spoken language. Instead, the peculiar human configuration may be a by-product of morpho-functional constraints linked to brain expansion.

<https://www.nature.com/articles/s41598-023-47778-2>

BRENNAN MCDONALD & PHILIPP KANSKE – Gender differences in empathy, compassion, and prosocial donations, but not theory of mind in a naturalistic social task

Despite broad interest, experimental evidence for gender differences in social abilities remains inconclusive. Two important factors may have limited previous results: (i) a lack of clear distinctions between empathy (sharing another's feelings), compassion (a feeling of concern toward others), and Theory of Mind (ToM; inferring others' mental states), and (ii) the absence of robust, naturalistic social tasks. Overcoming these limitations, in Study 1 (N = 295) we integrate three independent, previously published datasets, each using a dynamic and situated, video-based paradigm which disentangles ToM, empathy, and compassion, to examine gender differences in social abilities. We observed greater empathy and compassion in women compared to men, but found no evidence that either gender performed better in ToM. In Study 2 (n = 226) we extend this paradigm to allow participants to engage in prosocial donations. Along with replicating the findings of Study 1, we also observed greater prosocial donations in women compared to men. Additionally, we discuss an exploratory, novel finding, namely that ToM performance is positively associated with prosocial donations in women, but not men. Overall, these results emphasize the importance of establishing experimental designs that incorporate dynamic, complex stimuli to better capture the social realities that men and women experience in their daily lives.

<https://www.nature.com/articles/s41598-023-47747-9>

HELENA BIENIEK & PRZEMYSŁAW BABEL – Placebo hypoalgesia induced by operant conditioning: a comparative study on the effects of verbal, token-based, and social rewards and punishers

Operant conditioning was shown to be a mechanism of placebo hypoalgesia; however, only verbal rewards and punishers were applied in the previous study. We aimed to induce placebo hypoalgesia using more clinically relevant consequences: token-based and social. Participants were divided into three experimental groups (with verbal, social, and token-based rewards and punishers); and two control groups (with and without placebo application). During operant conditioning, participants in the experimental groups received thermal stimuli of equal intensity and were rewarded for reporting lower pain and punished for reporting higher pain compared to their pretest pain levels. The control groups did not receive any consequences. Our results revealed placebo hypoalgesia was induced by operant conditioning only in the experimental groups with social and token-based reinforcement, compared to the control groups. The hypoalgesic effect found in the group that received verbal reinforcement did not differ significantly from the control group with the placebo application. Moreover, expectations about upcoming pain intensity were found to be a mediator, and the number of reinforcers received during conditioning was a predictor of placebo hypoalgesia. These findings highlight the potential benefits of incorporating token-based and social consequences for optimizing treatment outcomes in pain management.

<https://www.nature.com/articles/s41598-023-47482-1>

PRAJWAL SHENOY, ANURAG GUPTA & VARADHAN S.K.M. – Comparison of synergy patterns between the right and left hand while performing postures and object grasps

The human hand, with many degrees of freedom, serves as an excellent tool for dexterous manipulation. Previous research has demonstrated that there exists a lower-dimensional subspace that synergistically controls the full hand kinematics. The elements of this subspace, also called synergies, have been viewed as the strategy developed by the CNS in the control of finger movements. Considering that the control of fingers is lateralized to the contralateral hemisphere, how the synergies differ for the control of the dominant and the non-dominant hand has not been widely addressed. In this paper, hand kinematics was recorded using electromagnetic tracking system sensors as participants made various postures and object grasps with their dominant hand and non-dominant hand separately. Synergies that explain 90% of variance in data of both hands were analyzed for similarity at the individual level as well as at the population level. The results showed no differences in synergies between the hands at both these levels. PC scores and cross-reconstruction errors were analyzed to further support the prevalence of similarity between the synergies of the hands. Future work is proposed, and implications of the results to the treatment and diagnosis of neuromotor disorders are discussed.

<https://www.nature.com/articles/s41598-023-47620-9>

New Scientist

ARTICLES

MICHAEL MARSHALL – How did Paranthropus, the last of the ape-people, survive for so long?

Paranthropus was an ape-like hominin that lived on in a world dominated by big-brained early humans. Recent archaeological discoveries, like stone tools, are revealing how they lived.

<https://www.newscientist.com/article/mg26034660-800-how-did-paranthropus-the-last-of-the-ape-people-survive-for-so-long/>

REVIEWS

SUSAN BLACKMORE – How do two new books on consciousness close in on the elusive field?

Review of 'The Four Realms of Existence' by Joseph E. LeDoux (Harvard University Press, 2023) and 'Consciousness' by John Parrington (Icon Books, 2023).

<https://www.newscientist.com/article/mg26034660-400-how-do-two-new-books-on-consciousness-close-in-on-the-elusive-field/>

PLoS One

PAPERS

GERBEN A. VAN KLEEF et al – Rebels with a cause? How norm violations shape dominance, prestige, and influence granting

Norms play an important role in upholding orderly and well-functioning societies. Indeed, violations of norms can undermine social coordination and stability. Much is known about the antecedents of norm violations, but their social consequences are poorly understood. In particular, it remains unclear when and how norm violators gain or lose influence in groups. Some studies found that norm violators elicit negative responses that curtail their influence in groups, whereas other studies documented positive consequences that enhance violators' influence. We propose that the complex relationship between norm violation and influence can be understood by considering that norm violations differentially shape perceptions of dominance and prestige, which tend to have opposite effects on voluntary influence granting, depending on the type of norm that is violated. We first provide correlational (Study 1) and causal (Study 2) evidence that norm violations are associated with dominance, and norm abidance with prestige. We then examine how dominance, prestige, and resultant influence granting are shaped by whether local group norms and/or global community norms are violated. In Study 3, protagonists who violated global (university) norms but followed local (sorority/fraternity) norms were more strongly endorsed as leaders than protagonists who followed global norms but violated local norms, because the former were perceived not only as high on dominance but also on prestige. In Study 4, popular high-school students were remembered as violating global (school) norms while abiding by local (peer) norms. In Study 5, individuals who violated global (organizational) norms while abiding by local (team) norms were assigned more leadership tasks when global and local norms conflicted (making violators "rebels with a cause") than when norms did not conflict, because the former situation inspired greater prestige. We discuss implications for the social dynamics of norms, hierarchy development, and leader emergence.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0294019>

CALLI SMITH & CATHERINE STAMOULIS – Effects of multidomain environmental and mental health factors on the development of empathetic behaviors and emotions in adolescence

Empathy is at the core of our social world, yet multidomain factors that affect its development in socially sensitive periods, such as adolescence, are incompletely understood. To address this gap, this study investigated associations between social, environmental and mental health factors, and their temporal changes, on adolescent empathetic behaviors/emotions and, for comparison, callous unemotional (CU) traits and behaviors, in the early longitudinal Adolescent Brain Cognitive

Development sample (baseline: $n = 11062$; 2-year follow-up: $n = 9832$, median age = 119 and 144 months, respectively). Caregiver affection towards the youth, liking school, having a close friend, and importance of religious beliefs/spirituality in the youth's life were consistently positively correlated with empathetic behaviors/emotions across assessments ($p < 0.001$, Cohen's $f = \sim 0.10$). Positive family dynamics and cohesion, living in a neighborhood that shared the family's values, but also parent history of substance use and (aggregated) internalizing problems were additionally positively associated with one or more empathetic behaviors at follow-up ($p < 0.001$, $f = \sim 0.10$). In contrast, externalizing problems, anxiety, depression, fear of social situations, and being withdrawn were negatively associated with empathetic behaviors and positively associated with CU traits and behaviors ($p < 0.001$, $f = \sim 0.1-0.44$). The latter were also correlated with being cyberbullied and/or discriminated against, anhedonia, and impulsivity, and their interactions with externalizing and internalizing issues. Significant positive temporal correlations of behaviors at the two assessments indicated positive (early) developmental empathetic behavior trajectories, and negative CU traits' trajectories. Negative changes in mental health adversely moderated positive trajectories and facilitated negative ones. These findings highlight that adolescent empathetic behaviors/emotions are positively related to multidomain protective social environmental factors, but simultaneously adversely associated with risk factors in the same domains, as well as bully victimization, discrimination, and mental health problems. Risk factors instead facilitate the development of CU traits and behaviors.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0293473>

Proceedings of the Royal Society B

PAPERS

CODY MOSER & PAUL E. SMALDINO – Innovation-facilitating networks create inequality

Theories of innovation often balance contrasting views that either smart people create smart things or smartly constructed institutions create smart things. While population models have shown factors including population size, connectivity and agent behaviour as crucial for innovation, few have taken the individual-central approach seriously by examining the role individuals play within their groups. To explore how network structures influence not only population-level innovation but also performance among individuals, we studied an agent-based model of the Potions Task, a paradigm developed to test how structure affects a group's ability to solve a difficult exploration task. We explore how size, connectivity and rates of information sharing in a network influence innovation and how these have an impact on the emergence of inequality in terms of agent contributions. We find, in line with prior work, that population size has a positive effect on innovation, but also find that large and small populations perform similarly per capita; that many small groups outperform fewer large groups; that random changes to structure have few effects on innovation in the task; and that the highest performing agents tend to occupy more central positions in the network. Moreover, we show that every network factor which improves innovation leads to a proportional increase in inequality of performance in the network, creating 'genius effects' among otherwise 'dumb' agents in both idealized and real-world networks.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.2281>

Royal Society Open Science

PAPERS

MD SAMS AFIF NIRJHOR & MAYUKO NAKAMARU – The evolution of cooperation in the unidirectional division of labour on a tree network

Division of labour on complex networks is rarely investigated using evolutionary game theory. We investigate a division of labour where divided roles are assigned to groups on the nodes of a general unidirectional finite tree graph network. From the network's original node, a task flows and is divided along the branches. A player is randomly selected in each group of cooperators and defectors, who receives a benefit from a cooperator in the upstream group and a part of the task. A cooperator completes their part by paying a cost and then passing it downstream until the entire task is completed. Defectors do not do anything and the division of labour stops, causing all groups to suffer losses due to the incomplete task. We develop a novel method to analyse the local stability in this general tree. We discover that not the benefits but the costs of the cooperation influence the evolution of cooperation, and defections in groups that are directly related to that group's task cause damage to players in that group. We introduce two sanction systems, one of which induces the evolution of cooperation more than the system without sanctions, and promote the coexistence of cooperator and defector groups.

<https://royalsocietypublishing.org/doi/10.1098/rsos.230830>

Science

REVIEWS

The Patriarchs: The Origins of Inequality

Today's patriarchal systems may appear robust and inevitable, but history shows that they are neither permanent nor preordained. This week in a special bonus segment of this series, host Angela Saini discusses her own book, *The Patriarchs*, which dispels commonly invoked myths about gender inequality and reveals how gendered power structures are constantly being renegotiated and reasserted.

Review of 'The Patriarchs: The Origins of Inequality' by Angela Saini. Beacon Press, 2023.

<https://www.science.org/doi/epdf/10.1126/science.adm6768>

{*There's supposed to be a podcast by Angela Saini somewhere. I can't find it. Here's an alternative review:*
<https://www.theguardian.com/books/2023/mar/08/the-patriarchs-by-angela-saini-review-the-roots-of-male-domination>}

Science Advances

PAPERS

BENEDETTA MARIANI et al – Prenatal experience with language shapes the brain

Human infants acquire language with notable ease compared to adults, but the neural basis of their remarkable brain plasticity for language remains little understood. Applying a scaling analysis of neural oscillations to address this question, we show that newborns' electrophysiological activity exhibits increased long-range temporal correlations after stimulation with speech, particularly in the prenatally heard language, indicating the early emergence of brain specialization for the native language.

<https://www.science.org/doi/10.1126/sciadv.adj3524>

Trends in Neurosciences

PAPERS

JAAN ARU, MATTHEW E. LARKUM & JAMES M. SHINE – The feasibility of artificial consciousness through the lens of neuroscience

Interactions with large language models (LLMs) have led to the suggestion that these models may soon be conscious. From the perspective of neuroscience, this position is difficult to defend. For one, the inputs to LLMs lack the embodied, embedded information content characteristic of our sensory contact with the world around us. Secondly, the architectures of present-day artificial intelligence algorithms are missing key features of the thalamocortical system that have been linked to conscious awareness in mammals. Finally, the evolutionary and developmental trajectories that led to the emergence of living conscious organisms arguably have no parallels in artificial systems as envisioned today. The existence of living organisms depends on their actions and their survival is intricately linked to multi-level cellular, inter-cellular, and organismal processes culminating in agency and consciousness.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(23\)00227-8](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(23)00227-8)

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