

EAORC BULLETIN 1,095 – 9 June 2024

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NOTICES

PUBLICATION ALERTS

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

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

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

EDITORIAL INTERJECTIONS

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

ACADEMIA.EDU – Historical Perspectives on the Significance of Archaeology in South Africa

South African Archaeological Society Goodwin Series 12, 44-55 (2019)

MATTHEW V. CARUANA & DOMINIC J. STRATFORD – Historical Perspectives on the Significance of Archaeology in the Cradle of Humankind, South Africa

The Cradle of Humankind World Heritage Site (CoHWHs), Gauteng Province, South Africa, preserves a remarkable palaeontological and archaeological record. Since the 1950s, stone tool assemblages have been excavated from well-known cave sites in this region, offering valuable insight into the behavioural and cognitive capabilities of early human ancestors. Modern research perspectives draw on a wealth of information to understand taphonomic, site formation, and technological aspects of these assemblages, and to interpret their significance in human evolution. At a point when high-resolution spatial data can be captured at sites in the Cradle region, reviewing the history of how current interpretive models of archaeological assemblages have developed is important for forging future directions in research. This history highlights the evolution of classification and analytical trends that have led to current multidisciplinary approaches to archaeology in southern Africa. It also illuminates the fact there has been a narrow focus on palaeoanthropological cave systems, with less information derived from archaeological assemblages found on the landscape above. As such, cave sites in the Cradle have provided perspectives

on the Earlier Stone Age, while the Middle and Later Stone Ages have unfortunately been under-represented. Future directions in research should focus on increasing chronological, environmental and spatial resolution of the archaeological record in this region, which requires the collation of a wide array of data from cave and open-air sites.

https://www.academia.edu/38941870/HISTORICAL_PERSPECTIVES_ON_THE_SIGNIFICANCE_OF_ARCHAEOLOGY_IN_THE_CRADLE_OF_HUMANKIND_SOUTH_AFRICA

OTHER PUBLICATIONS – Linguistic Hybridization in the Emergence of Creoles

The Cambridge Journal of Postcolonial Literary Inquiry 10:1, 74-89 (2023)

SALIKOKO S. MUFWENE – Linguistic Hybridization in the Emergence of Creoles

In this article I show how ubiquitous hybridity is in cultures. It is enabled by layers of population movements and contacts since the dispersal of Homo sapiens out of Africa around 50,000 years ago. I demonstrate how hybridization has proceeded in the emergence of creole language varieties and show that the same process has also driven, for instance, the emergence and differential evolution of English and the speciation of Vulgar Latin into the Romance languages. Differences in outcomes are determined by the specificities of the contact ecologies, including population structure, differences in the demographic proportions of the populations in contact and power relations between them, as well as patterns of population growth, among other factors. I argue that hybridity is not unique to languages. It is conspicuous in other domains of culture, including cuisine, music, clothing fashions, and technologies, for example. I submit a uniformitarian approach inspired by evolutionary biology to better understand how hybridization occurs.

<https://www.cambridge.org/core/journals/cambridge-journal-of-postcolonial-literary-inquiry/article/linguistic-hybridization-in-the-emergence-of-creoles/BE56AA2BC8500F428DD860041059FC26>

NEWS

NATURE BRIEFING – Fire pits offer glimpse into Neanderthal life

Ancient hearths reveal that generations of Neanderthals regularly visited a rugged river valley in Spain over a period of around 200 years. Previous work estimated that Homo neanderthalensis made these fires around 52,000 years ago — plus or minus a few thousand years. Researchers dramatically narrowed down this timeframe by analysing traces of Earth’s changing magnetic field preserved in the fire pits’ minerals. The oldest and youngest of the hearths were last lit at least 200 years apart, with decades-long intervals between the use of different hearths.

<https://www.nature.com/articles/d41586-024-01688-z>

SCIENCEADVISER – For early mammals, slow and steady evolution lost the race

The asteroid that struck our planet 66 million years ago brought the age of the dinosaurs to an explosive end, but did it also mark an explosive beginning for the age of the mammals? Until recently, many scientists believed that the mass extinction event at the end of the Cretaceous period created new ecological opportunities, resulting in a rapid “burst” of speciation among mammalian species. According to new research, however, early mammals didn’t diversify with a bang—instead, some slower-evolving lineages simply went out with a whimper.

Using a combination of fossil evidence and evolutionary trees, scientists determined that mammal species started diversifying at an impressive rate long before the decline of the dinosaurs. When the asteroid hit Earth, some groups couldn’t evolve quickly enough to keep up with the major environmental changes. These slowly speciating mammalian lineages gradually died out, allowing their faster counterparts to dominate. Each of these lineages subsequently gave rise to many, less speciation-prone descendants, which were more vulnerable to extinction—causing the cycle to repeat and resulting in unpredictable, imbalanced “pulses” of speciation.

The results suggest that a handful of isolated, fast-speciating lineages—rather than bursts of diversification spread across many groups—are responsible for the extraordinary variation seen in modern mammals.

<https://www.science.org/doi/10.1126/science.adj2793>

SCIENCEADVISER – Kicking Donald Trump et al. off Twitter helped reduce fake news

It might seem obvious that suspending people who spread fake news should reduce the amount of misinformation circulating on social media. But whether X (formerly Twitter) and other social media companies can or should act to reduce the circulation of misinformation has been a hot-button political issue: Several platforms have told U.S. policymakers they have limited ability to do so.

Now, researchers have provided some real-world evidence that deplatforming works by studying what happened after X suspended tens of thousands of accounts—including former President Donald Trump’s—for spreading misinformation soon after the 6 January 2021 riot at the U.S. Capitol. By monitoring a group of more than half a million other Twitter users determined as U.S. citizens, the team showed that after the suspensions these users received significantly less misinformation on the platform.

What’s more, the team found that “many of the misinformation traffickers who were not deplatformed left Twitter following the intervention,” expanding the reduction in the spread of fake news. The findings “indicate the capacity of social media

platforms to control the circulation of misinformation, and more generally to regulate public discourse,” the study authors write.

<https://www.nature.com/articles/s41586-024-07524-8>

SCIENCE DAILY – Infants hear significantly more speech than music at home

A new study has compared the amount of music and speech that children hear in infancy. Results showed that infants hear more spoken language than music, with the gap widening as the babies get older.

<https://www.sciencedaily.com/releases/2024/05/240530203434.htm>

SCIENCE DAILY – How does 'not' affect what we understand? Negation mitigates our interpretation

When we're told 'This coffee is hot' upon being served a familiar caffeinated beverage at our local diner or cafe, the message is clear. But what about when we're told 'This coffee is not hot'? Does that mean we think it's cold? Or room temperature? Or just warm? A team of scientists has now identified how our brains work to process phrases that include negation (i.e., 'not'), revealing that it mitigates rather than inverts meaning -- in other words, in our minds, negation merely reduces the temperature of our coffee and does not make it 'cold.'

<https://www.sciencedaily.com/releases/2024/05/240530182152.htm>

SCIENCE DAILY – Using AI to decode dog vocalizations

Have you ever wished you could understand what your dog is trying to say to you? Researchers are exploring the possibilities of AI, developing tools that can identify whether a dog's bark conveys playfulness or aggression.

<https://www.sciencedaily.com/releases/2024/06/240604132204.htm>

SCIENCE DAILY – Like ChatGPT, babies use 'helpless' infant period to learn powerful foundation models

Babies' brains are not as immature as previously thought, rather they are using the period of postnatal 'helplessness' to learn powerful foundation models similar to those underpinning generative Artificial Intelligence, according to a new study.

<https://www.sciencedaily.com/releases/2024/06/240605162522.htm>

SCIENCE DAILY – Baby baboon brain anatomy predicts which hand they will use to communicate

By studying the brain anatomy of newborn baby baboons, a research group was able to predict what hand they would use to communicate after they had been weaned.

<https://www.sciencedaily.com/releases/2024/06/240607121456.htm>

SCIENCE DAILY – What's going on in our brains when we plan?

An international team of scientists has uncovered neural mechanisms used in planning. Its results suggest that an interplay between the brain's prefrontal cortex and hippocampus allows us to imagine future outcomes in order to guide our decisions.

<https://www.sciencedaily.com/releases/2024/06/240607121448.htm>

SCIENCE.ORG NEWS – Detecting ‘tortured acronyms’ in research papers could help root out misconduct

Generated by plagiarism disguisers, these red flags can point to deeper problems with a paper.

{Please let the ToRtured ACronYM App be known as TRACYMAP...}

<https://www.science.org/doi/10.1126/science.adj2793>

SCIENCE.ORG NEWS – Tiny number of ‘supersharers’ spread the vast majority of fake news

Less than 1% of Twitter users posted 80% of misinformation about the 2020 U.S. presidential election.

<https://www.science.org/content/article/tiny-number-supersharers-spread-vast-majority-fake-news>

SCIENCE.ORG NEWS – Graves of Celtic princes suggest powerful role for women in ancient Germany

Status and power were inherited along maternal lines, DNA and other evidence indicate.

<https://www.science.org/content/article/graves-celtic-princes-suggest-powerful-role-women-ancient-germany>

SCIENCE.ORG NEWS – How were modern horses domesticated? Ancient DNA may settle debate

Genetic evidence credits horseback riding, not a hunger for horseflesh.

<https://www.science.org/content/article/how-were-modern-horses-domesticated-ancient-dna-may-settle-debate>

THE CONVERSATION – Human culture is changing too fast for evolution to catch up

Research is showing that many of our contemporary problems, such as the rising prevalence of mental health issues, are emerging from rapid technological advancement and modernisation. A theory that can help explain why we respond poorly to modern conditions, despite the choices, safety and other benefits they bring, is evolutionary mismatch.

<https://theconversation.com/human-culture-is-changing-too-fast-for-evolution-to-catch-up-heres-how-it-may-affect-you-227711>

PUBLICATIONS

Cell Metabolism

PAPERS

ELAINE ZAUNSEDER et al – Personalized metabolic whole-body models for newborns and infants predict growth and biomarkers of inherited metabolic diseases

Comprehensive whole-body models (WBMs) accounting for organ-specific dynamics have been developed to simulate adult metabolism, but such models do not exist for infants. Here, we present a resource of 360 organ-resolved, sex-specific models of newborn and infant metabolism (infant-WBMs) spanning the first 180 days of life. These infant-WBMs were parameterized to represent the distinct metabolic characteristics of newborns and infants, including nutrition, energy requirements, and thermoregulation. We demonstrate that the predicted infant growth was consistent with the recommendation by the World Health Organization. We assessed the infant-WBMs' reliability and capabilities for personalization by simulating 10,000 newborns based on their blood metabolome and birth weight. Furthermore, the infant-WBMs accurately predicted changes in known biomarkers over time and metabolic responses to treatment strategies for inherited metabolic diseases. The infant-WBM resource holds promise for personalized medicine, as the infant-WBMs could be a first step to digital metabolic twins for newborn and infant metabolism.

[https://www.cell.com/cell-metabolism/fulltext/S1550-4131\(24\)00182-7](https://www.cell.com/cell-metabolism/fulltext/S1550-4131(24)00182-7)

Current Biology

ARTICLES

MICHAEL GROSS – Ancient Australia

Modern humans expanding out of Africa reached the continent of Sahul, comprising today's Australia, Tasmania and Papua New Guinea, some 70,000 years ago. Studies modelling human movements and environmental change now complement genetic and archaeological data to produce a more detailed picture of how humans conquered a new continent.

[https://www.cell.com/current-biology/abstract/S0960-9822\(24\)00668-7](https://www.cell.com/current-biology/abstract/S0960-9822(24)00668-7)

PAPERS

CHRISTOPHER G. MULL et al – Maternal investment evolves with larger body size and higher diversification rate in sharks and rays

Across vertebrates, live bearing evolved at least 150 times from ancestral egg laying into diverse forms and degrees of prepartum maternal investment. A key question is how reproductive diversity arose and whether reproductive diversification underlies species diversification. To test this, we evaluate the most basal jawed vertebrates: the sharks, rays, and chimaeras, which have one of the greatest ranges of reproductive and ecological diversity among vertebrates. We reconstruct the sequence of reproductive mode evolution across a phylogeny of 610 chondrichthyans. We reveal egg laying as ancestral, with live bearing evolving at least seven times. Matrotrophy evolved at least 15 times, with evidence of one reversal. In sharks, transitions to live bearing and matrotrophy are more prevalent in larger-bodied tropical species. Further, the evolution of live bearing is associated with a near doubling of the diversification rate, but there is only a small increase associated with the appearance of matrotrophy. Although pre-copulatory sexual selection is associated with increased rates of speciation in teleosts, sexual size dimorphism in chondrichthyans does not appear to be related to sexual selection, and instead we find increased rates of speciation associated with the colonization of novel habitats. This highlights a potential key difference between chondrichthyans and other fishes, specifically a slower rate of evolution of reproductive isolation following speciation, suggesting different rate-limiting mechanisms for diversification between these clades. The chondrichthyan diversification and radiation, particularly throughout shallow tropical shelf seas and oceanic pelagic habitats, appear to be associated with the evolution of live bearing and proliferation of a wide range of maternal investment in developing offspring.

[https://www.cell.com/current-biology/abstract/S0960-9822\(24\)00617-1](https://www.cell.com/current-biology/abstract/S0960-9822(24)00617-1)

eLife

PAPERS

SOPHIE PETERSON et al – Sex Differences in Discrimination Behavior and Orbitofrontal Engagement During Context-Gated Reward Prediction

Animals, including humans, rely on contextual information to interpret ambiguous stimuli. Impaired context processing is a hallmark of several neuropsychiatric disorders, including schizophrenia, autism spectrum disorders, post-traumatic stress disorder, and addiction. While sex differences in the prevalence and manifestations of these disorders are well established, potential sex differences in context processing remain uncertain. Here we examined sex differences in the contextual control over cue-evoked reward seeking and its neural correlates, in rats. Male and female rats were trained in a bidirectional occasion-setting preparation in which the validity of two auditory reward-predictive cues was informed by the presence, or absence, of a visual contextual feature (LIGHT: X+ / DARK: X- / LIGHT: Y- / DARK: Y+). Females were significantly slower to acquire contextual control over cue-evoked reward seeking. However, once established, the contextual control over behavior was more robust in female rats; it showed less within-session variability (less influence of prior reward) and greater resistance to acute stress. This superior contextual control achieved by females was accompanied by an increased activation of the orbitofrontal cortex compared to males. Critically, these behavioral and neural sex differences were specific to the contextual modulation process and not observed in simple, context-independent, reward prediction tasks. These results indicate a sex-biased trade-off between the speed of acquisition and the robustness of performance in the contextual modulation of cued reward seeking. The different distribution of sexes along the fast learning ↔ steady performance continuum might reflect different levels of engagement of the orbitofrontal cortex, and might have implications for our understanding of sex differences in psychiatric disorders.

<https://elifesciences.org/reviewed-preprints/93509>

CHAO WEN et al with LARS CHITTKA – Does bumblebee preference of continuous over interrupted strings in string-pulling tasks indicate means-end comprehension?

Bumblebees (*Bombus terrestris*) have been shown to engage in string-pulling behavior to access rewards. The objective of this study was to elucidate whether bumblebees display a means-end comprehension in string-pulling task. We presented bumblebees with tasks involving choosing between two options: one where a string is connected to an artificial flower containing a reward and the other involving interrupted strings. Surprisingly, bumblebees displayed a consistent preference for pulling connected strings over interrupted ones after training with a stepwise pulling technique. Intriguingly, when exposed to novel string colors, bees continued to exhibit a bias towards pulling the connected string. This suggests that bumblebees engage in featural generalization of the visual display of the string connected to the flower in this task. When the bumblebees were confronted with coiled connected strings during the testing phase, they failed to identify and reject interrupted strings. This finding underscores the significance of visual consistency in enabling the bumblebees to perform the task successfully. Our results suggest that bumblebees distinguish between continuous strings and interrupted strings relies on a combination of image matching and associative learning, rather than means-end understanding. These insights contribute to a deeper understanding of the cognitive processes employed by bumblebees when tackling complex spatial tasks.

<https://elifesciences.org/reviewed-preprints/97018>

NOÉMIE TE RIETMOLEN et al – Speech and music recruit frequency-specific distributed and overlapping cortical networks

To what extent does speech and music processing rely on domain-specific and domain-general neural networks? Using whole-brain intracranial EEG recordings in 18 epilepsy patients listening to natural, continuous speech or music, we investigated the presence of frequency-specific and network-level brain activity. We combined it with a statistical approach in which a clear operational distinction is made between shared, preferred, and domain-selective neural responses. We show that the majority of focal and network-level neural activity is shared between speech and music processing. Our data also reveal an absence of anatomical regional selectivity. Instead, domain-selective neural responses are restricted to distributed and frequency-specific coherent oscillations, typical of spectral fingerprints. Our work highlights the importance of considering natural stimuli and brain dynamics in their full complexity to map cognitive and brain functions.

<https://elifesciences.org/reviewed-preprints/94509>

Evolutionary Anthropology

PAPERS

YAOWALAK CHAIMANEE et al – Early anthropoid primates: New data and new questions

Although the evolutionary history of anthropoid primates (monkeys, apes, and humans) appears relatively well-documented, there is limited data available regarding their origins and early evolution. We review and discuss here the earliest records of anthropoid primates from Asia, Africa, and South America. New fossils provide strong support for the Asian origin of anthropoid primates. However, the earliest recorded anthropoids from Africa and South America are still subject to debate, and the early evolution and dispersal of platyrrhines to South America remain unclear. Because of the rarity and incomplete

nature of many stem anthropoid taxa, establishing the phylogenetic relationships among the earliest anthropoids remains challenging. Nonetheless, by examining evidence from anthropoids and other mammalian groups, we demonstrate that several dispersal events occurred between South Asia and Afro-Arabia during the middle Eocene to the early Oligocene. It is possible that a microplate situated in the middle of the Neotethys Ocean significantly reduced the distance of overseas dispersal.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.22022>

BROOKE A. SCELZA – The cuckoldry conundrum

Concerns about cuckoldry are a dominant theme in evolutionary studies of mating, frequently used to explain sex differences in reproductive strategies. However, studies in nonhuman species have shown that cuckoldry can be associated with important benefits. These insights have not been well integrated with the human literature, which continues to focus on anticuckoldry tactics and negative repercussions for men. I evaluate two key assumptions central to human models of cuckoldry: (1) men are being tricked into investing in nonbiological offspring and (2) investment in nonbiological offspring is wasted. The ethnographic data on fatherhood shows that the concepts of pater and genitor are complex and locally constructed ideas that often include explicit knowledge of extra-pair paternity, countering the idea that nonpaternity results from trickery. Furthermore, rather than being a “waste,” paternity loss can be associated with important gains for men, helping to explain why men invest in nonbiological offspring.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.22023>

HUGO MEIJER – Janus faced: The co-evolution of war and peace in the human species

The human species presents a paradox. No other species possesses the propensity to carry out coalitionary lethal attacks on adult conspecifics coupled with the inclination to establish peaceful relations with genetically unrelated groups. What explains this seemingly contradictory feature? Existing perspectives, the “deep roots” and “shallow roots” of war theses, fail to capture the plasticity of human intergroup behaviors, spanning from peaceful cooperation to warfare. By contrast, this article argues that peace and war have both deep roots, and they co-evolved through an incremental process over several million years. On the one hand, humans inherited the propensity for coalitionary lethal violence from their chimpanzee-like ancestor. Specifically, having first inherited the skills to engage in cooperative hunting, they gradually repurposed such capacity to execute coalitionary killings of adult conspecifics and subsequently enhanced it through technological innovations like the use of weapons. On the other hand, they underwent a process of cumulative cultural evolution and, subsequently, of self-domestication which led to heightened cooperative communication and increased prosocial behavior within and between groups. The combination of these two biocultural evolutionary processes—coupled with feedback loop effects between self-domestication and Pleistocene environmental variability—considerably broadened the human intergroup behavioral repertoire, thereby producing the distinctive combination of conflictual and peaceful intergroup relations that characterizes our species. To substantiate this argument, the article synthesizes and integrates the findings from a variety of disciplines, leveraging evidence from evolutionary anthropology, primatology, archeology, paleo-genetics, and paleo-climatology.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.22027>

Frontiers in Human Neuroscience

PAPERS

JOÃO ARAÚJO et al – Atypical low-frequency cortical encoding of speech identifies children with developmental dyslexia

Slow cortical oscillations play a crucial role in processing the speech amplitude envelope, which is perceived atypically by children with developmental dyslexia. Here we use electroencephalography (EEG) recorded during natural speech listening to identify neural processing patterns involving slow oscillations that may characterize children with dyslexia. In a story listening paradigm, we find that atypical power dynamics and phase-amplitude coupling between delta and theta oscillations characterize dyslexic versus other child control groups (typically-developing controls, other language disorder controls). We further isolate EEG common spatial patterns (CSP) during speech listening across delta and theta oscillations that identify dyslexic children. A linear classifier using four delta-band CSP variables predicted dyslexia status (0.77 AUC). Crucially, these spatial patterns also identified children with dyslexia when applied to EEG measured during a rhythmic syllable processing task. This transfer effect (i.e., the ability to use neural features derived from a story listening task as input features to a classifier based on a rhythmic syllable task) is consistent with a core developmental deficit in neural processing of speech rhythm. The findings are suggestive of distinct atypical neurocognitive speech encoding mechanisms underlying dyslexia, which could be targeted by novel interventions.

<https://www.frontiersin.org/articles/10.3389/fnhum.2024.1403677/full>

Frontiers in Psychology
PAPERS**RUNYAN CHEN & HAO ZHU – Factors of children's allocation behavior: peer relationship and resource quantity as the main determinants**

This study investigated the resource allocation of Chinese sixth-graders and the role of peer relationship in different resource conditions (N = 132, Mage = 11.35 years, SD = 0.60). We designed the resource quantity as a between-group variable, with one group participating in a resource-limited experiment and another group in a resource-abundant experiment. Both groups of children allocated token resources to three types of peers relationships: good friends, disliked individuals, and strangers. Based on our experimental hypotheses, we presupposed three experimental outcomes: selfish allocation, equal allocation, and altruistic allocation. To analyze the data, we employed multivariate unordered regression analysis and performed two rounds of regression analyses using both selfish and altruistic allocations as reference categories to enhance the statistical power of regression model. Our results reveal that the resource quantity had a significant hindering effect on children's allocation behaviors, as the amount of available resources for allocation increased, so did their willingness to allocate selfishly. It was also found that an increase in resources led to a decrease in the proportion of children allocating equally. Nonetheless, the results still revealed generalized peer relationship preferences: children tended to allocate more resources to friends than to individuals they disliked. But when faced with disliked individuals, they were relatively more likely to allocate equally. Finally, we observed the proportion of equal allocation and discussed the similar impact of inequality aversion, different allocation contexts, and children's theory of mind on equitable allocation among sixth-graders.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1368224/full>

CHRISTOPH RÜHLEMANN & MATHIAS BARTHEL – Word frequency and cognitive effort in turns-at-talk: turn structure affects processing load in natural conversation

Frequency distributions are known to widely affect psycholinguistic processes. The effects of word frequency in turns-at-talk, the nucleus of social action in conversation, have, by contrast, been largely neglected. This study probes into this gap by applying corpus-linguistic methods on the conversational component of the British National Corpus (BNC) and the Freiburg Multimodal Interaction Corpus (FreMIC). The latter includes continuous pupil size measures of participants of the recorded conversations, allowing for a systematic investigation of patterns in the contained speech and language on the one hand and their relation to concurrent processing costs they may incur in speakers and recipients on the other hand. We test a first hypothesis in this vein, analyzing whether word frequency distributions within turns-at-talk are correlated with interlocutors' processing effort during the production and reception of these turns. Turns are found to generally show a regular distribution pattern of word frequency, with highly frequent words in turn-initial positions, mid-range frequency words in turn-medial positions, and low-frequency words in turn-final positions. Speakers' pupil size is found to tend to increase during the course of a turn at talk, reaching a climax toward the turn end. Notably, the observed decrease in word frequency within turns is inversely correlated with the observed increase in pupil size in speakers, but not in recipients, with steeper decreases in word frequency going along with steeper increases in pupil size in speakers. We discuss the implications of these findings for theories of speech processing, turn structure, and information packaging. Crucially, we propose that the intensification of processing effort in speakers during a turn at talk is owed to an informational climax, which entails a progression from high-frequency, low-information words through intermediate levels to low-frequency, high-information words. At least in English conversation, interlocutors seem to make use of this pattern as one way to achieve efficiency in conversational interaction, creating a regularly recurring distribution of processing load across speaking turns, which aids smooth turn transitions, content prediction, and effective information transfer.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1208029/full>

iScience
PAPERS**JONGROK DO, OLIVER JAMES & YEE-JOON KIM – Choice-dependent delta-band neural trajectory during semantic category decision making in the human brain**

Recent human brain imaging studies have identified widely distributed cortical areas that represent information about the meaning of language. Yet, the dynamic nature of widespread neural activity as a correlate of the semantic information processing remains poorly explored. Our state space analysis of electroencephalograms (EEGs) recorded during semantic match-to-category task show that depending on the semantic category and decision path chosen by participants, whole-brain delta-band dynamics follow distinct trajectories that are correlated with participants' response time on a trial-by-trial basis. Especially, the proximity of the neural trajectory to category decision-specific region in the state space was predictive of participants' decision-making reaction times. We also found that posterolateral regions primarily encoded word categories while postero-central regions encoded category decisions. Our results demonstrate the role of neural dynamics embedded in the evolving multivariate delta-band activity patterns in processing the semantic relatedness of words and the semantic category-based decision-making.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)01398-1](https://www.cell.com/iscience/fulltext/S2589-0042(24)01398-1)

Mind & Language**PAPERS****ROBERT HOPKINS – Design and syntax in pictures**

Many attempts to define depiction appeal to viewers' perceptual responses. Such accounts are liable to give a central role in determining depictive content to picture features responsible for the response, design. A different project is to give a compositional semantics for depictive content. Such attempts identify syntax: picture features systematically responsible for the content of the whole. Design and syntax are competitors. But syntax requires system, in how picture features contribute to content, that design does not. By examining John Kulvicki's semantics for basic depictive content, I argue that the relevant systematicity is absent from the pictorial realm.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12485>

LAURA DELGADO – Names are not (always) predicates

A main selling point of predicativism is that, in addition to accounting for predicative uses of proper names, it can successfully account for their referential uses while treating them as predicates, thus providing a uniform semantics for proper names. The strategy is to postulate an unpronounced determiner that is realised with names when they appear to function as singular terms, making them effectively a concealed determiner phrase. I argue against the thesis that names are really predicates in referential uses. I discuss four different environments where names do not behave like the determiner phrases that are thought to embed them.

{I'm always wary of models that rely on absent things to work; see

http://martinedwardes.me.uk/scitsiugnil/ebooks/sources_of_language_grammar_full.pdf pp82-83 for the problem of "yes". Predicativism, with its trace determiners, is one of the things I am wary of.}

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12484>

KRIS GOFFIN & GERARDO VIERA – Emotions in time: The temporal unity of emotion phenomenology

According to componential theories of emotional experience, emotional experiences are phenomenally complex in that they consist of experiential parts, which may include cognitive appraisals, bodily feelings, and action tendencies. These componential theories face the problem of emotional unity: Despite their complexity, emotional experiences also seem to be phenomenologically unified. Componential theories have to give an account of this unity. We argue that existing accounts of emotional unity fail and that instead emotional unity is an instance of experienced causal-temporal unity. We propose that felt emotional unity arises from our experience of the temporal-causal order of the world.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12489>

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>

KRISTIN ANDREWS – “All animals are conscious”: Shifting the null hypothesis in consciousness science

The marker approach is taken as best practice for answering the distribution question: Which animals are conscious? However, the methodology can be used to increase confidence in animals many presume to be unconscious, including *C. elegans*, leading to a trilemma: accept the worms as conscious; reject the specific markers; or reject the marker methodology for answering the distribution question. I defend the third option and argue that answering the distribution question requires a secure theory of consciousness. Accepting the hypothesis all animals are conscious will promote research leading to secure theory, which is needed to create reliable consciousness tests for animals and AIs. Rather than asking the distribution question, we should shift to the dimensions question: How are animals conscious?

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12498>

COMMENTARIES**RACHEL GOODMAN – Confusion and explanation**

In *Talking about*, Unnsteinsson defends an intentionalist theory of reference by arguing that confused referential intentions degrade reference. Central to this project is a “belief model” of both identity confusion and unconfused thought. By appealing to a well-known argument from Campbell, I argue that this belief model falls short, because it fails to explain the inferential behavior it promises to explain. Campbell's argument has been central in the contemporary literature on Frege's puzzle, but Unnsteinsson's account of confusion provides an opportunity for more clarity about how the argument is best interpreted, and what it shows.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12510>

ELMAR UNNSTEINSSON – Inference and identity

I argue that beliefs about the identity or distinctness of objects are necessary to explain some normal inferential transitions between thoughts in humans. Worries about vicious regress are not powerful enough to dismantle such an argument. As an upshot, the idea that thinkers “trade on” identity without any corresponding belief remains somewhat mysterious.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12511>

Nature**NEWS****These Neanderthal fire pits offer an extraordinarily precise snapshot of ancient life**

Researchers used traces of Earth’s changing magnetic field in sediments to identify the activity of ancient humans.

<https://www.nature.com/articles/d41586-024-01688-z>

ARTICLES**SÉGOLÈNE VANDELDE – Precision dating pinpoints time between use of ancient fireplaces**

Knowing the occupation timescales for ancient sites offers insights into population dynamics. A dating approach now establishes the time frame during which prehistoric hearths were in use at a high level of precision.

<https://www.nature.com/articles/d41586-024-01501-x>

ULLRICH ECKER et al with STEPHAN LEWANDOWSKY – Misinformation poses a bigger threat to democracy than you might think

In today’s polarized political climate, researchers who combat mistruths have come under attack and been labelled as unelected arbiters of truth. But the fight against misinformation is valid, warranted and urgently required.

<https://www.nature.com/articles/d41586-024-01587-3>

PAPERS**ÁNGELA HERREJÓN-LAGUNILLA et al – The time between Palaeolithic hearths**

Resolving the timescale of human activity in the Palaeolithic Age is one of the most challenging problems in prehistoric archaeology. The duration and frequency of hunter-gatherer camps reflect key aspects of social life and human–environment interactions. However, the time dimension of Palaeolithic contexts is generally inaccurately reconstructed because of the limitations of dating techniques¹, the impact of disturbing agents on sedimentary deposits² and the palimpsest effect^{3,4}. Here we report high-resolution time differences between six Middle Palaeolithic hearths from El Salt Unit X (Spain) obtained through archaeomagnetic and archaeostratigraphic analyses. The set of hearths covers at least around 200–240 years with 99% probability, having decade- and century-long intervals between the different hearths. Our results provide a quantitative estimate of the time framework for the human occupation events included in the studied sequence. This is a step forward in Palaeolithic archaeology, a discipline in which human behaviour is usually approached from a temporal scale typical of geological processes, whereas significant change may happen at the smaller scales of human generations. Here we reach a timescale close to a human lifespan.

<https://www.nature.com/articles/s41586-024-07467-0>

Nature Communications**PAPERS****PHILIPPE ALBOUY et al with ROBERT J. ZATORRE – Spectro-temporal acoustical markers differentiate speech from song across cultures**

Humans produce two forms of cognitively complex vocalizations: speech and song. It is debated whether these differ based primarily on culturally specific, learned features, or if acoustical features can reliably distinguish them. We study the spectro-temporal modulation patterns of vocalizations produced by 369 people living in 21 urban, rural, and small-scale societies across six continents. Specific ranges of spectral and temporal modulations, overlapping within categories and across societies, significantly differentiate speech from song. Machine-learning classification shows that this effect is cross-culturally robust, vocalizations being reliably classified solely from their spectro-temporal features across all 21 societies. Listeners unfamiliar with the cultures classify these vocalizations using similar spectro-temporal cues as the machine learning algorithm. Finally, spectro-temporal features are better able to discriminate song from speech than a broad range of other acoustical variables, suggesting that spectro-temporal modulation—a key feature of auditory neuronal tuning—accounts for a fundamental difference between these categories.

<https://www.nature.com/articles/s41467-024-49040-3>

JAN GROHN et al – General mechanisms of task engagement in the primate frontal cortex

Staying engaged is necessary to maintain goal-directed behaviors. Despite this, engagement exhibits continuous, intrinsic fluctuations. Even in experimental settings, animals, unlike most humans, repeatedly and spontaneously move between

periods of complete task engagement and disengagement. We, therefore, looked at behavior in male macaques (*Macaca mulatta*) in four tasks while recording fMRI signals. We identified consistent autocorrelation in task disengagement. This made it possible to build models capturing task-independent engagement. We identified task general patterns of neural activity linked to impending sudden task disengagement in mid-cingulate gyrus. By contrast, activity centered in perigenual anterior cingulate cortex (pgACC) was associated with maintenance of performance across tasks. Importantly, we carefully controlled for task-specific factors such as the reward history and other motivational effects, such as response vigor, in our analyses. Moreover, we showed pgACC activity had a causal link to task engagement: transcranial ultrasound stimulation of pgACC changed task engagement patterns.

<https://www.nature.com/articles/s41467-024-49128-w>

YANNICK BECKER et al – Planum temporale asymmetry in newborn monkeys predicts the future development of gestural communication's handedness

The planum temporale (PT), a key language area, is specialized in the left hemisphere in prelinguistic infants and considered as a marker of the pre-wired language-ready brain. However, studies have reported a similar structural PT left-asymmetry not only in various adult non-human primates, but also in newborn baboons. Its shared functional links with language are not fully understood. Here we demonstrate using previously obtained MRI data that early detection of PT left-asymmetry among 27 newborn baboons (*Papio anubis*, age range of 4 days to 2 months) predicts the future development of right-hand preference for communicative gestures but not for non-communicative actions. Specifically, only newborns with a larger left-than-right PT were more likely to develop a right-handed communication once juvenile, a contralateral brain-gesture link which is maintained in a group of 70 mature baboons. This finding suggests that early PT asymmetry may be a common inherited prewiring of the primate brain for the ontogeny of ancient lateralised properties shared between monkey gesture and human language.

<https://www.nature.com/articles/s41467-024-47277-6>

Nature Human Behaviour

ARTICLES

CECILIA PADILLA-IGLESIAS & ANDREA B. MIGLIANO – Musical instruments, tools, language and genetic data reveal ancient hunter-gatherer networks

Central Africa is home to the greatest number of hunter-gatherers remaining in the world, but the origins of their culture remain unclear. We compiled a dataset of Central African hunter-gatherer musical instruments, subsistence tools, specialized vocabulary and genome-wide single-nucleotide polymorphism data, which revealed ancient networks of cultural and linguistic exchange that spanned thousands of kilometres.

<https://www.nature.com/articles/s41562-024-01893-w>

PAPERS

JOSCHA GRETZINGER et al with KATERINA HARVATI & JOHANNES KRAUSE – Evidence for dynastic succession among early Celtic elites in Central Europe

The early Iron Age (800 to 450 BCE) in France, Germany and Switzerland, known as the 'West-Hallstattkreis', stands out as featuring the earliest evidence for supra-regional organization north of the Alps. Often referred to as 'early Celtic', suggesting tentative connections to later cultural phenomena, its societal and population structure remain enigmatic. Here we present genomic and isotope data from 31 individuals from this context in southern Germany, dating between 616 and 200 BCE. We identify multiple biologically related groups spanning three elite burials as far as 100 km apart, supported by trans-regional individual mobility inferred from isotope data. These include a close biological relationship between two of the richest burial mounds of the Hallstatt culture. Bayesian modelling points to an avuncular relationship between the two individuals, which may suggest a practice of matrilineal dynastic succession in early Celtic elites. We show that their ancestry is shared on a broad geographic scale from Iberia throughout Central-Eastern Europe, undergoing a decline after the late Iron Age (450 BCE to ~50 CE).

<https://www.nature.com/articles/s41562-024-01888-7>

Nature Humanities & Social Sciences Communications

PAPERS

ABEY KOSHY – Excavating sexual difference in language and thinking

The essay questions the predominant perception of human thinking as a gender-neutral enterprise. It holds that sexual difference is deeply engrained in language and thinking, regardless of the biological sexual identities of those who express those thoughts. The essay critiques the traditional thought for superficially linking the meaning of sexuality with biological gender. It opposes the characterisation of masculine thinking as man's thinking and feminine thinking as woman's. Masculine language expressions can sometimes happen from women writers, and male thinkers sometimes produce feminine writings. Biological bodily sexual identity is not a pointer to the psychical sexual behaviour of humans. Psychoanalytic gender theories explaining the inessentiality of human sexuality help this work to demonstrate that man's and woman's sex identities are

arbitrarily produced by language. It exposes the process of the emergence of sexual difference in the human psyche, language, and thinking. To do that, this study anchors primarily on the reflections of Lacan, Nietzsche, and Saussure. Lacanian psychoanalysis is used as the theoretical source to explain the role of language in forming masculine and feminine identities. Nietzsche's prioritisation of the value of natural existence, sensuality, and beauty over abstract truths propagated by masculine metaphysics enables us to explain how feminine experience differs from the masculine conception of truth. Saussure's linguistic theory, which challenged the masculine representative function of language, is used to justify the essay's claim that 'affects' created on the human body by objects of the world are the source of feminine linguistic expression. 'Affects' produce bodily intensities, from which new linguistic signs, metaphors, images, and idioms are formed, leading to imaginative reactivation of instinctual libidinal drives, which is considered the source of sexually different thinking.

<https://www.nature.com/articles/s41599-024-03216-w>

Nature Methods

ARTICLES

CORNELIUS EICHNER & ALFRED ANWANDER – Ultra-high-resolution diffusion MRI resource of chimpanzee white matter connectivity

Comparing brain connectivity between chimpanzees and humans is a means of understanding human cognition and evolution. To address the scarcity of chimpanzee neuroimaging data, we introduce a high-quality MRI resource that reveals previously unseen anatomical details, offering valuable insights into human brain evolution.

<https://www.nature.com/articles/s41592-024-02271-0>

PAPERS

CORNELIUS EICHNER et al with EBC CONSORTIUM & CATHERINE CROCKFORD – Detailed mapping of the complex fiber structure and white matter pathways of the chimpanzee brain

Long-standing questions about human brain evolution may only be resolved through comparisons with close living evolutionary relatives, such as chimpanzees. This applies in particular to structural white matter (WM) connectivity, which continuously expanded throughout evolution. However, due to legal restrictions on chimpanzee research, neuroscience research currently relies largely on data with limited detail or on comparisons with evolutionarily distant monkeys. Here, we present a detailed magnetic resonance imaging resource to study structural WM connectivity in the chimpanzee. This open-access resource contains (1) WM reconstructions of a postmortem chimpanzee brain, using the highest-quality diffusion magnetic resonance imaging data yet acquired from great apes; (2) an optimized and validated method for high-quality fiber orientation reconstructions; and (3) major fiber tract segmentations for cross-species morphological comparisons. This dataset enabled us to identify phylogenetically relevant details of the chimpanzee connectome, and we anticipate that it will substantially contribute to understanding human brain evolution.

<https://www.nature.com/articles/s41592-024-02270-1>

Nature Reviews Psychology

PAPERS

TONGLIN JIANG et al – The unique nature and psychosocial implications of awe

Psychological research has explored awe's intricate nature and far-reaching consequences. Awe profoundly influences the sense of self (which has considerable psychosocial implications), but there are complexities across the literature regarding how awe impacts the self. In this Review, we synthesize the literature about awe and suggest an integrative approach to understanding awe's psychosocial implications. We begin by introducing awe as defined by an established theoretical model and examining the methodological challenges to the scientific study of awe. We then discuss discrepancies in current research on awe's impacts on the self and consider an alternative approach in which awe promotes a broad, non-egocentric perspective on the self. We argue that this approach offers deep insight into the implications of awe and review related findings focusing on cognition and motivation, social dynamics and well-being. Finally, we examine cultural commonalities and diversity in experiences of awe and conclude by suggesting avenues for future inquiry.

<https://www.nature.com/articles/s44159-024-00322-z>

MIREILLE BABINEAU et al – Syntactic bootstrapping as a mechanism for language learning

Several mechanisms have been proposed to explain how young children solve the puzzle of mapping spoken words to their meanings. The influential syntactic bootstrapping theory postulates that children learn the meanings of words (particularly verbs) by paying attention to the syntactic structures in which they occur. In this Review, we first look at the scholarly climate and pivotal experimental findings that gave rise to syntactic bootstrapping theory, how the postulated word-learning mechanism has been investigated, and the role for this mechanism in current and future research. We discuss the prerequisites behind such a powerful learning and inference process and connect it to contemporary learning frameworks that examine how humans build and update their knowledge about the world. Syntactic bootstrapping theory has shaped the landscape of language-acquisition research, and this research has reshaped syntactic bootstrapping in turn — leading to ground-breaking insights into how children assign meanings to words and learn the complex network of language.

<https://www.nature.com/articles/s44159-024-00317-w>

Nature Scientific Reports

PAPERS

XUAN-THE TRAN et al – Multimodal fusion for anticipating human decision performance

Anticipating human decisions while performing complex tasks remains a formidable challenge. This study proposes a multimodal machine-learning approach that leverages image features and electroencephalography (EEG) data to predict human response correctness in a demanding visual searching task. Notably, we extract a novel set of image features pertaining to object relationships using the Segment Anything Model (SAM), which enhances prediction accuracy compared to traditional features. Additionally, our approach effectively utilizes a combination of EEG signals and image features to streamline the feature set required for the Random Forest Classifier (RFC) while maintaining high accuracy. The findings of this research hold substantial potential for developing advanced fault alert systems, particularly in critical decision-making environments such as the medical and defence sectors.

<https://www.nature.com/articles/s41598-024-63651-2>

STEFANA GARELLO et al – The role of embodied cognition in action language comprehension in L1 and L2

In this study we carried out a behavioral experiment comparing action language comprehension in L1 (Italian) and L2 (English). Participants were Italian native speakers who had acquired the second language late (after the age of 10). They performed semantic judgments on L1 and L2 literal, idiomatic and metaphorical action sentences after viewing a video of a hand performing an action that was related or unrelated to the verb used in the sentence. Results showed that responses to literal and metaphorical L1 sentences were faster when the action depicted was related to the verb used rather than when the action depicted was unrelated to the verb used. No differences were found for the idiomatic condition. In L2 we found that all responses to the three conditions were facilitated when the action depicted was related to the verb used. Moreover, we found that the difference between the unrelated and the related modalities was greater in L2 than in L1 for the literal and the idiomatic condition but not for the metaphorical condition. These findings are consistent with the embodied cognition hypothesis of language comprehension.

<https://www.nature.com/articles/s41598-024-61891-w>

ARMANDO FALCUCCI et al – A pre-Campanian Ignimbrite techno-cultural shift in the Aurignacian sequence of Grotta di Castelcivita, southern Italy

The Aurignacian is the first European technocomplex assigned to *Homo sapiens* recognized across a wide geographic extent. Although archaeologists have identified marked chrono-cultural shifts within the Aurignacian mostly by examining the techno-typological variations of stone and osseous tools, unraveling the underlying processes driving these changes remains a significant scientific challenge. Scholars have, for instance, hypothesized that the Campanian Ignimbrite (CI) super-eruption and the climatic deterioration associated with the onset of Heinrich Event 4 had a substantial impact on European foraging groups. The technological shift from the Protoaurignacian to the Early Aurignacian is regarded as an archaeological manifestation of adaptation to changing environments. However, some of the most crucial regions and stratigraphic sequences for testing these scenarios have been overlooked. In this study, we delve into the high-resolution stratigraphic sequence of Grotta di Castelcivita in southern Italy. Here, the Uluzzian is followed by three Aurignacian layers, sealed by the eruptive units of the CI. Employing a comprehensive range of quantitative methods—encompassing attribute analysis, 3D model analysis, and geometric morphometrics—we demonstrate that the key technological feature commonly associated with the Early Aurignacian developed well before the deposition of the CI tephra. Our study provides thus the first direct evidence that the volcanic super-eruption played no role in this cultural process. Furthermore, we show that local paleo-environmental proxies do not correlate with the identified patterns of cultural continuity and discontinuity. Consequently, we propose alternative research paths to explore the role of demography and regional trajectories in the development of the Upper Paleolithic.

<https://www.nature.com/articles/s41598-024-59896-6>

New Scientist

NEWS

Babies group together their squeals and growls to prepare for speech

Babies seem to cluster together their squeals and growling noises, rather than making them sporadically, which suggests they are part of their preparation for talking.

<https://www.newscientist.com/article/2433468-babies-group-together-their-squeals-and-growls-to-prepare-for-speech/>

Chicks link shapes with 'bouba' and 'kiki' sounds just like humans

Humans from many cultures tend to associate the nonsense words “bouba” and “kiki” with different shapes – and now it seems that 3-day-old chicks have the same inclinations.

<https://www.newscientist.com/article/2433516-chicks-link-shapes-with-bouba-and-kiki-sounds-just-like-humans/>

Ancient snake drawings are among the largest known rock art worldwide

Rock art along the Orinoco river in South America is made up of some of the largest etchings we know of and could date back 2000 years.

<https://www.newscientist.com/article/2433595-ancient-snake-drawings-are-among-the-largest-known-rock-art-worldwide/>

PLoS Biology**PAPERS****ANDREW CHANG et al with DAVID POEPEL – The human auditory system uses amplitude modulation to distinguish music from speech**

Music and speech are complex and distinct auditory signals that are both foundational to the human experience. The mechanisms underpinning each domain are widely investigated. However, what perceptual mechanism transforms a sound into music or speech and how basic acoustic information is required to distinguish between them remain open questions. Here, we hypothesized that a sound's amplitude modulation (AM), an essential temporal acoustic feature driving the auditory system across processing levels, is critical for distinguishing music and speech. Specifically, in contrast to paradigms using naturalistic acoustic signals (that can be challenging to interpret), we used a noise-probing approach to untangle the auditory mechanism: If AM rate and regularity are critical for perceptually distinguishing music and speech, judging artificially noise-synthesized ambiguous audio signals should align with their AM parameters. Across 4 experiments (N = 335), signals with a higher peak AM frequency tend to be judged as speech, lower as music. Interestingly, this principle is consistently used by all listeners for speech judgments, but only by musically sophisticated listeners for music. In addition, signals with more regular AM are judged as music over speech, and this feature is more critical for music judgment, regardless of musical sophistication. The data suggest that the auditory system can rely on a low-level acoustic property as basic as AM to distinguish music from speech, a simple principle that provokes both neurophysiological and evolutionary experiments and speculations.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002631>

PLoS One**PAPERS****M. BÖHME et al – *Buronius manfredschmidii*—A new small hominid from the early late Miocene of Hammerschmiede (Bavaria, Germany)**

The known diversity of European middle and late Miocene hominids has increased significantly during the last decades. Most of these great apes were frugivores in the broadest sense, ranging from soft fruit frugivores most like chimpanzees to hard/tough object feeders like orangutans, varying in size from larger than siamangs (over 17 kg) to larger than most chimpanzees (~60–70 kg). In contrast to the frequent sympatry of hominoids in the early-to-middle Miocene of Africa, in no European Miocene locality more than one hominid taxon has been identified. Here we describe the first case of hominid sympatry in Europe from the 11.62 Ma old Hammerschmiede HAM 5 level, best known from its excellent record of *Danuvius guggenmosi*. The new fossils are consistent in size with larger pliopithecoids but differ morphologically from any pliopithecoid and from *Danuvius*. They are also distinguished from early and middle Miocene apes, share affinities with late Miocene apes, and represent a small hitherto unknown late Miocene ape *Buronius manfredschmidii*. With an estimated body mass of about 10 kg it represents the smallest known hominid taxon. The relative enamel thickness of *Buronius* is thin and contrasts with *Danuvius*, whose enamel is twice as thick. The differences between *Buronius* and *Danuvius* in tooth and patellar morphology, enamel thickness and body mass are indicative of differing adaptations in each, permitting resource partitioning, in which *Buronius* was a more folivorous climber.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0301002>

RAINI N. SIZEMORE & LEVI R. BAKER – Perceiving greater commitment increases selfishness among disagreeable people

Perceiving that a partner is highly committed tends to benefit close relationships. However, there may be relational drawbacks to perceiving high commitment. In particular, given that high commitment may signal that a partner is unlikely to leave the relationship, perceiving that a partner is highly committed might lead people low in agreeableness to feel comfortable behaving more selfishly toward that partner. One correlational study consisting of a highly diverse sample of individuals (n = 307), one observational study of newlywed couples (n = 202), and one experiment with undergraduate couples (n = 252) examined whether the implications of perceived partner commitment for selfish behaviors depend on agreeableness. Results demonstrated that perceiving high commitment resulted in more selfish behavior among disagreeable participants (Studies 1–3), but less selfish behavior among agreeable participants (Studies 1 and 3). Together, these results suggest that signaling commitment to disagreeable partners may backfire in romantic relationships.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0303693>

Proceedings of the Royal Society B

PAPERS

ERIN M. WALL & SARAH C. WOOLLEY – Social experiences shape song preference learning independently of developmental exposure to song

Communication governs the formation and maintenance of social relationships. The interpretation of communication signals depends not only on the signal's content but also on a receiver's individual experience. Experiences throughout life may interact to affect behavioural plasticity, such that a lack of developmental sensory exposure could constrain adult learning, while salient adult social experiences could remedy developmental deficits. We investigated how experiences impact the formation and direction of female auditory preferences in the zebra finch. Zebra finches form long-lasting pair bonds and females learn preferences for their mate's vocalizations. We found that after 2 weeks of cohabitation with a male, females formed pair bonds and learned to prefer their partner's song regardless of whether they were reared with ('normally reared') or without ('song-naive') developmental exposure to song. In contrast, females that heard but did not physically interact with a male did not prefer his song. In addition, previous work has found that song-naive females do not show species-typical preferences for courtship song. We found that cohabitation with a male ameliorated this difference in preference. Thus, courtship and pair bonding, but not acoustic-only interactions, strongly influence preference learning regardless of rearing experience, and may dynamically drive auditory plasticity for recognition and preference.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2024.0358>

ELIZABETH M. SPEECHLEY et al – Aggressive interactions influence cognitive performance in Western Australian magpies

Extensive research has investigated the relationship between the social environment and cognition, suggesting that social complexity may drive cognitive evolution and development. However, evidence for this relationship remains equivocal. Group size is often used as a measure of social complexity, but this may not capture intraspecific variation in social interactions. Social network analysis can provide insight into the cognitively demanding challenges associated with group living at the individual level. Here, we use social networks to investigate whether the cognitive performance of wild Western Australian magpies (*Gymnorhina tibicen dorsalis*) is related to group size and individual social connectedness. We quantified social connectedness using four interaction types: proximity, affiliative, agonistic and vocal. Consistent with previous research on this species, individuals in larger groups performed better on an associative learning task. However, social network position was also related to cognitive performance. Individuals receiving aggressive interactions performed better, while those involved in aggressive interactions with more group members performed worse. Overall, this suggests that cognitive performance is related to specific types of social interaction. The findings from this study highlight the value of considering fine-grained metrics of sociality that capture the challenges associated with social life when testing the relationship between the social environment and cognition.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2024.0435>

LEWIS REVELY et al – The diversity of social complexity in termites

Sociality underpins major evolutionary transitions and significantly influences the structure and function of complex ecosystems. Social insects, seen as the pinnacle of sociality, have traits like obligate sterility that are considered 'master traits', used as single phenotypic measures of this complexity. However, evidence is mounting that completely aligning both phenotypic and evolutionary social complexity, and having obligate sterility central to both, is erroneous. We hypothesize that obligate and functional sterility are insufficient in explaining the diversity of phenotypic social complexity in social insects. To test this, we explore the relative importance of these sterility traits in an understudied but diverse taxon: the termites. We compile the largest termite social complexity dataset to date, using specimen and literature data. We find that although functional and obligate sterility explain a significant proportion of variance, neither trait is an adequate singular proxy for the phenotypic social complexity of termites. Further, we show both traits have only a weak association with the other social complexity traits within termites. These findings have ramifications for our general comprehension of the frameworks of phenotypic and evolutionary social complexity, and their relationship with sterility.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.2791>

Royal Society Open Science

PAPERS

OLIVIA MACMILLAN-SCOTT & MIRCO MUSOLESI – (Ir)rationality and cognitive biases in large language models

Do large language models (LLMs) display rational reasoning? LLMs have been shown to contain human biases due to the data they have been trained on; whether this is reflected in rational reasoning remains less clear. In this paper, we answer this question by evaluating seven language models using tasks from the cognitive psychology literature. We find that, like humans, LLMs display irrationality in these tasks. However, the way this irrationality is displayed does not reflect that shown by humans. When incorrect answers are given by LLMs to these tasks, they are often incorrect in ways that differ from human-like biases. On top of this, the LLMs reveal an additional layer of irrationality in the significant inconsistency of the

responses. Aside from the experimental results, this paper seeks to make a methodological contribution by showing how we can assess and compare different capabilities of these types of models, in this case with respect to rational reasoning.

<https://royalsocietypublishing.org/doi/10.1098/rsos.240255>

Trends in Cognitive Sciences

ARTICLES

ERIN HANNON & JOEL SNYDER – What rhythm production can tell us about culture

Jacoby and colleagues used an iterative rhythm reproduction paradigm with listeners from around the world to provide evidence for both rhythm universals (simple-integer ratios 1:1 and 2:1) and cross-cultural variation for specific rhythmic categories that can be linked to local music traditions in different regions of the world.

{EAORC Bulletin 1,082, p9.}

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(24\)00083-4](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00083-4)

PAPERS

RHODRI CUSACK, MARC'AURELIO RANZATO & CHRISTINE J. CHARVET – Helpless infants are learning a foundation model

Humans have a protracted postnatal helplessness period, typically attributed to human-specific maternal constraints causing an early birth when the brain is highly immature. By aligning neurodevelopmental events across species, however, it has been found that humans are not born with especially immature brains compared with animal species with a shorter helpless period. Consistent with this, the rapidly growing field of infant neuroimaging has found that brain connectivity and functional activation at birth share many similarities with the mature brain. Inspired by machine learning, where deep neural networks also benefit from a 'helpless period' of pre-training, we propose that human infants are learning a foundation model: a set of fundamental representations that underpin later cognition with high performance and rapid generalisation.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(24\)00114-1](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00114-1)

MICHAEL B. LEVENTHAL & HIROFUMI MORISHITA – How childhood social isolation causes social dysfunction: deprivation or mismatch?

There is a major gap in our understanding of how childhood social isolation causes adult social dysfunction. To stimulate future developmental mechanistic studies, we present two conceptual models which highlight that isolation can disrupt developmental events that are concurrent (social deprivation model) or subsequent (developmental mismatch model) to adverse experience.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(24\)00118-9](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00118-9)

SHAUN GALLAGHER, ANTONINO RAFFONE & SALVATORE M. AGLIOTI – The pattern theory of compassion

Concepts of empathy, sympathy and compassion are often confused in a variety of literatures. This article proposes a pattern-theoretic approach to distinguishing compassion from empathy and sympathy. Drawing on psychology, Western philosophy, affective neuroscience, and contemplative science, we clarify the nature of compassion as a specific pattern of dynamically related factors that include physiological, cognitive, and affective processes, relational/intersubjective processes, and motivational/action tendencies. We also show that the dynamic nature of the compassion pattern is reflected in neuroscientific findings, as well as in compassion practice. The pattern theory of compassion allows us to make several clear distinctions between compassion, empathy, and sympathy.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(24\)00084-6](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00084-6)

KYLE MAHOWALD et al with NANCY KANWISHER & EVELINA FEDORENKO – Dissociating language and thought in large language models

Large language models (LLMs) have come closest among all models to date to mastering human language, yet opinions about their linguistic and cognitive capabilities remain split. Here, we evaluate LLMs using a distinction between formal linguistic competence (knowledge of linguistic rules and patterns) and functional linguistic competence (understanding and using language in the world). We ground this distinction in human neuroscience, which has shown that formal and functional competence rely on different neural mechanisms. Although LLMs are surprisingly good at formal competence, their performance on functional competence tasks remains spotty and often requires specialized fine-tuning and/or coupling with external modules. We posit that models that use language in human-like ways would need to master both of these competence types, which, in turn, could require the emergence of separate mechanisms specialized for formal versus functional linguistic competence.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(24\)00027-5](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00027-5)

RUOBING XIA et al – Common and distinct neural mechanisms of attention

Despite a constant deluge of sensory stimulation, only a fraction of it is used to guide behavior. This selective processing is generally referred to as attention, and much research has focused on the neural mechanisms controlling it. Recently, research has broadened to include more ways by which different species selectively process sensory information, whether

due to the sensory input itself or to different behavioral and brain states. This work has produced a complex and disjointed body of evidence across different species and forms of attention. However, it has also provided opportunities to better understand the breadth of attentional mechanisms. Here, we summarize the evidence that suggests that different forms of selective processing are supported by mechanisms both common and distinct.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(24\)00005-6](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00005-6)

MORTEN L. KRINGELBACH, YONATAN SANZ PERL & GUSTAVO DECO – The Thermodynamics of Mind

To not only survive, but also thrive, the brain must efficiently orchestrate distributed computation across space and time. This requires hierarchical organisation facilitating fast information transfer and processing at the lowest possible metabolic cost. Quantifying brain hierarchy is difficult but can be estimated from the asymmetry of information flow. Thermodynamics has successfully characterised hierarchy in many other complex systems. Here, we propose the ‘Thermodynamics of Mind’ framework as a natural way to quantify hierarchical brain orchestration and its underlying mechanisms. This has already provided novel insights into the orchestration of hierarchy in brain states including movie watching, where the hierarchy of the brain is flatter than during rest. Overall, this framework holds great promise for revealing the orchestration of cognition.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(24\)00075-5](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00075-5)

MADELEINE E. GROSS & JONATHAN W. SCHOOLER – Standing out: an atypical salience account of creativity

Creativity often entails gaining a novel perspective, yet it remains uncertain how this is accomplished. Atypical salience processing may foster creative thinking by prioritizing putatively irrelevant information, thereby broadening the material accessible for idea generation and inhibiting attentional fixedness; in essence, motivating creative individuals to incorporate information that others overlook.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(24\)00111-6](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00111-6)

Trends in Genetics

PAPERS

SAHIBJOT SRAN, AMANDA RINGLAND & TRACY A. BEDROSIAN – Building the brain mosaic: an expanded view

The complexity of the brain is closely tied to its nature as a genetic mosaic, wherein each cell is distinguished by a unique constellation of somatic variants that contribute to functional and phenotypic diversity. Postzygotic variation arising during neurogenesis is recognized as a key contributor to brain mosaicism; however, recent advances have broadened our understanding to include sources of neural genomic diversity that develop throughout the entire lifespan, from embryogenesis through aging. Moving beyond the traditional confines of neurodevelopment, in this review, we delve into the complex mechanisms that enable various origins of brain mosaicism.

[https://www.cell.com/trends/genetics/abstract/S0168-9525\(24\)00130-6](https://www.cell.com/trends/genetics/abstract/S0168-9525(24)00130-6)

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