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NOTICES

FORMATTED VERSION OF THIS BULLETIN

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

PUBLICATION ALERTS

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

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

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

EDITORIAL INTERJECTIONS

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

ACADEMIA.EDU – Evolutionary morphology of the haplorhine hamate

The Anatomical Record, 1-24 (2026).

LAURA E. HUNTER et al – Evolutionary morphology of the haplorhine hamate

Primates adopt a variety of hand postures during an impressive diversity of locomotor and manipulative behaviors. Morphological research has found that elements of the hand skeleton, such as the hamate, hold key information for inferring hand use and locomotor kinematics in extinct species. However, debate remains surrounding how and when specialized locomotor hand postures evolved. This debate persists due to uncertainty concerning which taxa possess derived character states for given traits and whether those states evolved via selective response to functional demands or are the result of other biological processes, such as developmental constraint or phylogeny. Phylogenetic comparative methods provide one way to disentangle the role of phylogeny in shaping skeletal morphology and thus can provide clarity concerning which traits arose via other means, such as directed selection. Here, we quantify several functionally relevant hamate traits and employ phylogenetic methods (bayou, OUwie) to infer if and how selection has shaped these traits in particular taxa or clades. We find that selection caused the hamulus to reduce in tarsiers and to lengthen in cebids and hominoids, potentially related to increased demand for grip capability during behaviors like tool use or—in hominoids—below-branch suspension. Evidence from traits associated with suspension suggests that this behavior evolved independently in hylobatids and hominids. Shifts toward shorter hamate body lengths in Gorilla and hominins cannot be explained by phylogeny alone. Variability among hominines eschews simple interpretation, but this result suggests that if knuckle-walking evolved once in hominines, then the hamate subsequently lengthened in Pan.

https://www.academia.edu/170585288/Evolutionary_morphology_of_the_haplorhine_hamate

ACADEMIA.EDU – Did modern human carpal morphology evolve from knuckle walking traits?

Proceedings of the Royal Society B 293: 20260556 (2026).

LAURA E. HUNTER et al – Did modern human carpal morphology evolve from knuckle walking traits?

Hominin forelimbs have evolved from primarily locomotive to manipulative appendages over approximately 6 million years. As such, hand functions in fossil hominins and the Pan–Homo last common ancestor (LCA) are intensely debated, with carpal morphology central to this debate. However, owing to their irregular and challenging shapes, few studies have comprehensively quantified carpal morphology. We analyse the overall carpal morphology of anthropoids, including fossil hominins, using spherical harmonics and use classification methods to characterize fossil hominins within the context of extant taxa. Results show that hominins share with African apes derived carpal morphology possibly related to knuckle walking. Furthermore, unique modern human carpal morphology appears to have evolved from these possible knuckle-walking features and in a piecemeal manner, causing some hominin capitates to resemble those of palmigrade monkeys. Striking variation in biomechanically relevant carpal morphology and retention of potentially ancestral features persists as late as *Homo naledi*, suggesting that most hominins probably neither knuckle walked nor extensively used stone tools. These results indicate that the hominin carpus evolved from an African ape-like wrist, with radial-side reorganization related to manipulation occurring only recently. Although it remains unclear whether the LCA knuckle walked, our results suggest that this is the most likely existing hypothesis.

https://www.academia.edu/170585279/Did_modern_human_carpal_morphology_evolve_from_knuckle_walking_traits

ACADEMIA.EDU – Wittgenstein and religious dogma*International Journal of the Philosophy of Religion* 61:39-49 (2007).**CHRISTOPHER HOYT – Wittgenstein and religious dogma**

It is well understood that Wittgenstein defends religious faith against positivistic criticisms on the grounds of its logical independence. But exactly how are we to understand the nature of that independence? Most scholars take Wittgenstein to equate language-games with belief-systems, and thus to assert that religions are logical schemes founded on their own basic beliefs and principles of inference. By contrast, I argue that on Wittgenstein's view, to have religious faith is to hold fast to a certain picture of the world according to which one orients one's actions and attitudes, possibly even in dogmatic defiance of contrary evidence. Commitment to such a picture is grounded in passion, not intellection, and systematic coherence is largely irrelevant.

https://www.academia.edu/6498977/Wittgenstein_and_religious_dogma

ACADEMIA.EDU – Paleogeography, paleoclimatology, chronology, and human activity at a paleolithic site*International Journal of the Philosophy of Religion* 61:39-49 (2007).**J. EMILI AURA TORTOSA et al with I. DAVIDSON – On the southern border. Hort de Cortés-Volcán del Faro (Valencia, Spain): paleogeography, paleoclimatology, chronology, and human activity at a paleolithic site (35-19 cal kBP)**

The Iberian Mediterranean Region has been considered a refuge during the stadial episodes of the Late Pleistocene, in comparison with more northern regions. Bioclimatic conditions and the ways in which humans coped with the identified fluctuations have been analyzed based on organic records, mainly plant and animal remains obtained from archaeological sites located in inland valleys. At the same time, the study of the effects of sea level rise on the paleogeography of the continental margin has revealed uneven flooding between regions, depending on their morphology and geology. These dynamics have been linked to changes in the production systems of the lithic and osseous industries, in subsistence and mobility, comparing their trends with other regions. The study of the Paleolithic site of Cova de Hort de Cortés-Volcán del Faro (HC-VF), in the Gulf of Valencia, has quantified the flooding of the extensive alluvial plain by sea level rise. The review of a significant sample of archaeological materials obtained in previous excavations has enabled the identification of a long sequence of human occupations dating from approximately 35 to 19 cal kBP. For the first time, data on the entire deposit have been obtained from the study of plant (charcoal) and animal remains (mammals, birds, fish, and mollusks), radiocarbon dating, and lithic and osseous production systems. The results provide relevant information on paleogeographic changes and the increase in arid conditions at the end of the Last Glacial Maximum. Both processes could have affected the distribution of humans, favoring concentration in areas with higher biodiversity. This allows us to propose a hypothesis about the differences observed in the record of the central area of Mediterranean Iberia compared to the southern region.

https://www.academia.edu/170467697/On_the_southern_border_Hort_de_Cort%C3%A9s_Volc%C3%A1n_del_Faro_Valencia_Spain_paleogeography_paleoclimatology_chronology_and_human_activity_at_a_paleolithic_site_35_19_cal_kBP

NEWS**NATURE BRIEFING – Teens' bad decisions are not all irrational**

Blaming teenagers' undeveloped brains when they don't choose the 'sensible' path — by retaliating against an insult in a school corridor, for example — does them a disservice, argues evolutionary criminologist Evelyn Svingen. "Teenagers do weigh up what they are doing. The costs that weigh most heavily on them are social, and adults consistently underestimate how heavy they are," she writes. "The teenager who hits back in the corridor is running on an ancient programme." She offers advice on how schools and parents can "create an environment where the rewarding thing to do and the sensible thing to do point in the same direction".

<https://theconversation.com/when-a-teenager-makes-the-stupid-choice-their-brain-is-working-exactly-as-designed-287503>

NATURE BRIEFING – Humans spoke tens of thousands of languages

Humanity might have spoken tens of thousands of languages between 3,000 and 1,000 years ago, which have dwindled down to the around 7,500 unique languages used today. Researchers estimate that the number of spoken languages ballooned starting at the end of the last glacial period, as humans moved from hunter-gatherer groups into agricultural communities. After peaking around 2,000 years ago, the number began to fall again, possibly because of the spread of powerful, monolingual cultural groups through conquest and trade.

<https://www.science.org/doi/10.1126/science.adx4343>

NEWS FROM SCIENCE – Chimps and bonobos hug and hold hands just like us

New study suggests ancient origins of reassuring social touch among apes.

<https://www.science.org/content/article/chimps-and-bonobos-hug-and-hold-hands-just-us>

SCIENCEADVISER – Monkeys have a knack for geometry

Not all humans are math whizzes, but we all possess an intuitive capacity for geometric reasoning—an ability long thought to distinguish us from other primates. As scientists report in a new study, however, monkeys may have a better understanding of geometry than traditionally assumed.

Researchers tested geometric reasoning in four rhesus macaques and four olive baboons, using nutritious fruit snacks to entice the primates into playing a touch-screen game that involved matching two-dimensional shapes. The shapes didn't differ significantly in size, color, or form, so the monkeys had to find the correct match based solely on geometric similarity. The team performed the same experiment with a group of 58 American preschoolers, 21 American adults, and 79 adults from Indigenous Tsimane' communities—groups that don't typically undergo the same kind of formal schooling found in the United States—in Bolivia. The work revealed that both humans and monkeys appear to think about basic geometry using a combination of high-level perceptual and abstract symbolic representations.

"What surprised us wasn't just that monkeys could do the task," study senior author Jessica Cantlon said in a statement. "It was that monkeys, children and adults seemed to think about geometric relationships in fundamentally the same way." The study, she added, "suggests that children start with deep, evolutionarily ancient intuitions about shape and space," which educators can build on when teaching geometry.

<https://www.pnas.org/doi/full/10.1073/pnas.2532934123>

SCIENCEADVISER – Warrior princess

The skeletons of 4000-year-old mummified Egyptian princesses suggest the daggers, bows, and other weapons buried with them weren't just for show. The royal women's bodies showed evidence of healed traumatic injuries, enlarged forearm bones, and other signs of intensive martial activities. "These princesses were not leading sedentary lives of luxury," the lead study author said. "They were well-conditioned athletes whose bodies were hardened by the same skilled force and disciplined movement as the men of their time."

<https://www.frontiersin.org/journals/environmental-archaeology/articles/10.3389/fearc.2026.1844402/full>

SCIENCEADVISER – The language crisis is millennia in the making

Humanity's linguistic diversity is in trouble. Roughly half of the 7500 languages signed or spoken today are endangered, and at least four go extinct every year. But while preserving the languages that do persist is a top priority, a new study in Science suggests that we are already more than one millennium beyond humanity's linguistic "golden age."

Linguists have long debated when the most languages were in use: Some have argued that the total number of languages remained roughly steady from the last ice age until modern-day European colonialism, others suggested that diversity has steadily declined since the dawn of agriculture about 12,000 years ago, and a third camp theorized a high point sometime before large states became established 4000 years ago. Since writing was not developed until around 6000 years ago, however, understanding dynamics of early language remained challenging. So, a team of anthropologists applied data on the languages, distributions, and behaviors of present-day hunter-gatherers to estimates of the total human population size and the size and number of individual cultures over the last 12,000 years. This allowed them to create a model of the total number of languages in use at any point since the last ice age ended.

The researchers showed that linguistic diversity rose steadily for around 10,000 years, reaching a "golden age" of tens of thousands of languages around 1000 to 3000 years ago before entering a language loss free-fall that continues to this day. The results reveal that the language crisis is not the result of modern colonialism but rather the culmination of millennia of cultural exchange and homogenization.

<https://www.science.org/doi/10.1126/science.adx4343>

SCIENCENEWS – Ancient Egyptian princesses knew their way around war weapons

Analysis of six mummies from ancient Egypt challenges the idea that the bows and daggers buried with some royal women were merely ceremonial.

<https://www.sciencenews.org/article/ancient-egyptian-princesses-weapons-war>

THE CONVERSATION – Great apes were using touch to reassure and keep the peace 6my before humans

Friendly touching to prevent a fight may be one of our most ancient social tools.

<https://theconversation.com/great-apes-were-using-touch-to-reassure-and-keep-the-peace-six-million-years-before-humans-evolved-new-research-286077>

THE CONVERSATION – When a teenager makes a 'stupid choice', their brain is working just as designed

If a young person trusts the system to deliver a just outcome, their brain's urgent need for retribution is dialled down.

<https://theconversation.com/when-a-teenager-makes-the-stupid-choice-their-brain-is-working-exactly-as-designed-287503>

THE CONVERSATION – How was the first language formed?

Listen to the The Conversation's Curious Kids podcast to hear anthropologist April Nowell explain the origins of language.
<https://theconversation.com/how-was-the-first-language-formed-287887>

THE CONVERSATION – Ancient Egyptian princesses weapons show they weren't just figureheads

Women played a crucial role in all aspects of the development and endurance of the state, including some who ruled the country in their own right.
<https://theconversation.com/ancient-egyptian-princesses-werent-just-figureheads-their-weapons-reveal-lives-of-skill-and-strength-288029>

THE CONVERSATION – Meet Likweli – the newly named monkey that hints at Congo's hidden secrets

It's rare for a completely new primate species to be named.
<https://theconversation.com/meet-likweli-the-newly-named-monkey-that-hints-at-congos-hidden-secrets-288022>

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

ALEXANDRA E. KRALICK – No More Sneaking Around: The Changing Terminology of Orangutan Male Reproductive Strategies

Orangutans exhibit male bimaturism, characterized by pronounced variation among adult males. Early research framed this variation as age-based morphs with two alternative reproductive tactics (ARTs), contrasting “sneak and rape” subadults with “consort and combat” adults. Subsequent research demonstrated that males previously labeled as subadults can remain unflanged well into adulthood, and both types of males mate with and without force, leading to a revised ART framework: flanged males “sit, call, and wait” while unflanged males “go, search, and find.” This study examines how these frameworks have been taken up and represented over time in the scholarly literature.

A bibliometric analysis of 810 publications which use orangutan and morph- and strategy-based keywords identified 124 relevant publications which were coded by morph and strategy classification and analyzed for temporal trends.

The “subadult” and “sneak and rape” terminology is no longer dominant in peer-reviewed primatology; yet, these imprecise frameworks persist, particularly outside of primatology in the secondary literature regarding the evolution of human male aggression.

The persistence of the “sneak and rape” framework does not reflect empirical evidence, as primatology now distinguishes male morphs without defining them by sexual aggression. Nor can it be explained by disciplinary lag alone, as some studies update the term from subadult to unflanged male while retaining outdated behavioral framing. Instead, selective uptake aligns with broader narratives in human evolution that naturalize male aggression and female vulnerability, underscoring the need to clarify primatological frameworks that inform interpretations of human evolution.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.70252>

Cell Reports Physical Science

PAPERS

MUYAO LI et al – Strategy evolution on interdependent networks

Cooperation is essential to the prosperity of human and biological systems. Its emergence depends on not only on the structure of interactions within a single system but also the coupling between interdependent systems. While the analytical theory for strategy evolution in isolated systems is well established, the effect of coupling has been studied mainly through specific models and simulations. Here, we develop a general analytical framework for strategy evolution on interdependent networks with arbitrary within-system structures and cross-system coupling. We derive the explicit condition under which natural selection favors cooperation and show that coupling can promote cooperation even when no isolated system sustains it. Cooperation is maximized under weak but non-zero coupling, while excessively strong interdependence suppresses it. Cooperation is further enhanced when strategy updating is biased toward the larger or less cooperation-prone system. Our analysis explains when and why coupling promotes cooperation.

[https://www.cell.com/cell-reports-physical-science/fulltext/S2666-3864\(26\)00346-2](https://www.cell.com/cell-reports-physical-science/fulltext/S2666-3864(26)00346-2)

Current Biology

ARTICLES

KINGA KOCSIS & MICHAEL A. LONG – Integrative neurobiology: Tracing the origins of vocal innovations

Alston's singing mouse has emerged as an intriguing model for the comparative study of vocal control. New work on the species sets the stage to understand the proximate mechanisms and evolutionary roots of novel acoustic communication traits.

PAPERS**PROSPER A. FIAVE et al – A ventro-temporal area supporting human allocentric representations**

Everyday interactions require not only knowing what objects are and where they are located in egocentric (body-centered) space but also understanding their internal spatial structure defined in allocentric (object-centered) space. Disruptions in allocentric computations have profound clinical consequences, yet the neural basis of such spatial coding mechanisms remains unclear. Classical models of visual cognition distinguish a ventral stream for object recognition, a dorsal stream for spatial processing, and a fronto-parietal network for attentional control. Here, we test the hypothesis that a recently identified region in the posterior infero-temporal cortex (PIT) may implement a key processing stage by integrating object and spatial information to support allocentric spatial representation. Using a novel behavioral paradigm combined with task-based and resting-state fMRI, we show that PIT is selectively engaged in allocentric processing yet exhibits a functional profile distinct from nearby visual category-selective cortex. Multivariate and representational similarity analyses reveal distinct allocentric and egocentric representations in PIT and posterior parietal cortex, with PIT supporting category-general allocentric representations across stimulus types. Connectivity analyses further show that PIT is stably coupled with the posterior parietal cortex across spatial demands but exhibits flexible, task-dependent interactions with ventral visual areas during allocentric (not egocentric) processing. These findings position PIT as a critical node at the interface of object and spatial systems, linking ventral stream representations with dorsal spatial processing in human visuospatial cognition.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(26\)00806-7](https://www.cell.com/current-biology/fulltext/S0960-9822(26)00806-7)

eLife**PAPERS****HAITENG WANG et al – Human Brain-Wide Activation of Sleep Rhythms**

During sleep, our brain undergoes highly synchronized activity, orchestrated by distinct neural rhythms. Little is known about the associated brain activation during these sleep rhythms, and even less about their functional implications. In this study, we investigated the brain-wide activation underlying human sleep rhythms by employing simultaneous electroencephalography (EEG) and functional magnetic resonance imaging (fMRI) in 107 participants during nocturnal nap (first half of the night). We identified robust coupling between slow oscillations (SOs) and fast spindles during deep non-rapid eye movement (NREM) sleep (N2/3 stages), with spindle peaks consistently occurring just before the SO UP-state. This SO-spindle coupling was linked to elevated activation in both the thalamus and hippocampus, alongside increased functional connectivity from the hippocampus to the thalamus and from the thalamus to the medial prefrontal cortex (mPFC). An open-ended cognitive state decoding analysis suggested that these activations may relate to episodic memory processes, yet were distinct from task-related networks. Together, these findings highlight the thalamus as a key coordinator of hippocampal-cortical communication during sleep and provide new insights into the mechanisms by which synchronized sleep rhythms may support memory consolidation.

<https://elifesciences.org/reviewed-preprints/103956>

Evolutionary Human Sciences**PAPERS****THOMAS HOLDING, PAUL E. SMALDINO & CHARLOTTE O. BRAND – Analogies evolve by increasing transmission fidelity in the communication of complex information**

Analogies are a fundamental part of our cognition and communication. Humans are also a social species with shared cultural repertoires learnt throughout our lifetimes. As such, we expect analogies to enable the learning of complex, novel information by communication that takes advantage of shared cultural information. Here, we demonstrate the plausibility of this proposal and clarify its scope through computational modelling. We first model the individual-level process of learning via analogy with access to a shared repertoire of cultural information, using NK landscapes to represent high-dimensional solution spaces for complex problems. We then analyse a model of population dynamics to consider the conditions under which analogical communication will evolve and be maintained when costly. Our analyses suggest that even when analogy use is costly in terms of both search time and memory constraints, it can nevertheless be advantageous by allowing learners to obtain high-quality solutions more efficiently and more often than those who don't learn via analogy.

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/analogies-evolve-by-increasing-transmission-fidelity-in-the-communication-of-complex-information/5D2FC5BA339563B0EE2BCB527129792C>

Frontiers in Artificial Intelligence**PAPERS****MUHAMET KASTRATI et al – Do language families matter? Evaluating LLMs for sentiment analysis through a hierarchical cross-lingual lens**

Social media sentiment analysis has become one of the most significant instruments for understanding the opinion of the population in the spheres of healthcare, politics, and education. Yet, large language models (LLMs) remain unevenly

distributed in their linguistic coverage, failing to adequately serve a large portion of the world's languages. This study evaluates five state-of-the-art LLMs: GPT-4o, Gemini 2.0 Flash, DeepSeek-V3, Mistral Large, and Claude 3.7 Sonnet on three-class sentiment classification across 36 datasets spanning 36 languages, with emphasis on low- and medium-resource settings, using zero-shot and few-shot prompting without task-specific fine-tuning. In addition to the traditional measures of performance per language, the study presents a hierarchical analysis of languages based on a genealogical tree of Indo-European, Afro-Asiatic, Niger-Congo, Turkic, Austronesian, and English Creole language families, so that it is possible to identify the systematic patterns of performance superiority and inferiority among the language families. The findings show that few-shot prompting improves the results of a vast majority of languages, with several models approaching or surpassing the performance of the state-of-the-art benchmark of task-specific models. The GPT-4o and Claude achieved the highest performance in the high-resource and medium-resource settings, and Gemini is a competent trade-off that allows balancing the performance and the computational cost. Although it has lower zero-shot performance, Mistral benefits the most from few-shot prompting and becomes highly competitive in the few-shot setting. Despite these developments, the level of performance on low-resource languages, such as Oromo, Xitsonga, Azerbaijani, and Twi, remains significantly lower, underscoring that progress in multilingual LLMs requires moving beyond English-centric evaluation toward genuinely representative and globally inclusive benchmarks.

<https://www.frontiersin.org/journals/artificial-intelligence/articles/10.3389/frai.2026.1854873/full>

Frontiers in Environmental Archaeology

PAPERS

ZEINAB HASHESH, AHMED GABR & ROXIE WALKER – Bioarchaeological reassessment of Dahshur royal skeletal remains from the Late Middle Kingdom (c. 1850–1700 BCE)

This study addresses the underutilization of bioarchaeological approaches in Egyptian research by reevaluating six royal skeletal remains (King Hor and five princesses) from de Morgan's 1894–1895 Dahshur excavation. Historically, these remains—now dispersed across two museums—received limited and contentious early analysis.

The present research employs an integrated methodology, combining systematic osteological re-examination (biological profiles, activity patterns, non-metric traits, and paleopathology), radiological imaging (X-ray), and Fourier transform infrared spectroscopy (FTIR) for embalming materials.

This multi-analytical approach generates comprehensive data on elite health, activity patterns, and familial relationships. It also provides new perspectives on the royal women interred with historically male-associated weapons and regalia, exploring whether these items reflect active use or symbolic burial.

By critically correlating skeletal and historical evidence, this study refines individual identities, contextualizes funerary practices, and demonstrates the vital role of human remains analysis in reconstructing ancient Egyptian life and death.

<https://www.frontiersin.org/journals/environmental-archaeology/articles/10.3389/fearc.2026.1844402/full>

Frontiers in Psychology

PAPERS

SIEM BUSEYNE, FIEN DEPAEPE & ANNELIES RAES – Personality's voice: how personality traits shape verbal processes in collaborative problem-solving

This exploratory study examined the associations between personality traits and verbal interactions during collaborative problem solving (CPS) in adult workplace teams. Using the Business Attitudes Questionnaire, we examined personality domains, facets, and compounds in relation to CPS-specific verbal behaviors and linguistic indicators. Data were collected from 36 participants across nine professional teams during a CPS training exercise consisting of multiple problem-solving intervals. Verbal interactions were analyzed through quantitative content analysis, in which utterance-level CPS behaviors were coded and transformed into relative frequencies, complemented by dictionary-based linguistic analysis using Linguistic Inquiry and Word Count. The analyses were treated as exploratory. Multilevel models accounting for repeated observations within individuals suggested that Openness, particularly the Change-Oriented facet, was linked to greater knowledge sharing and cognitive process word use. Ambitious individuals tended to contribute more to shared knowledge but less to coordination and negotiation, while Results-oriented individuals tended to show higher word counts, and Strategic individuals tended to use more analytical language. The study serves as an initial empirical mapping of possible theory-informed links between personality and verbal CPS processes and identifies directions for future confirmatory research.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2026.1830668/full>

Mind & Language

PAPERS

HENRY SCHILLER – Advocacy and the function of folk psychology

Why do we care about getting mental state attributions right? A common answer is that folk psychology is a proto-scientific theory that allows us to predict and explain the behavior of physical systems. I argue that this position is inconsistent with one of the central practices in which attribution of desire occurs: to advocate for our interests and for the interests of others.

I explain how such advocating speech works, and in which contexts such uses of “wants” are the default. I use these observations to argue that there may be an irreducible normative function to folk psychology.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.70031>

KATHERINE RITCHIE & NY VASIL – Generics favor stability

Humans seek to predict, explain, and control their environments. Generalizations—like those expressed by “children like candy” and “cigarettes cause cancer”—provide one resource to facilitate these tasks. We develop a proposal tying the acceptability judgments of generics to the psychological functions of generalizations. We argue that the notion of stability and a recognition of the varied scope of regularities provide resources for a unified account of an apparently diverse range of generics: causal and categorical, essentialist and structural. This unifying account coheres with the function of generalization in human psychology, and provides a new framework ripe for further investigation.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.70019>

Nature

ARTICLES

FREDA KREIER – Humanity spoke thousands of languages at the dawn of farming — now many of them are lost

A shift from nomadic lifestyles could have triggered linguistic diversity before it then declined rapidly.

<https://www.nature.com/articles/d41586-026-02279-w>

Nature Reviews Psychology

PAPERS

ELENA ECCHER, MANUELA PIAZZA & GIORGIO VALLORTIGARA – The interplay between culture, task and biology in spatial–numerical associations

Adults tend to systematically associate numerical information with spatial positions, such as associating smaller numbers with the left and larger numbers with the right side of space. These spatial–numerical associations were initially attributed to cultural factors such as reading direction, but evidence from non-human animals suggests a biological foundation. In this Review, we examine behavioural evidence to clarify the origins of spatial–numerical associations and how cultural and biological factors shape their existence and direction. First, we discuss how specific tasks and stimulus types constrain the implications of spatial–numerical association studies. Then we review findings from non-human animals and human infants that suggest early biological predispositions for a left-to-right mapping of numerical information onto space. Next, we consider findings from adults with different written language experience, which highlight the role of cultural experience. Finally, we speculate on possible mechanisms underlying an implicit form of non-symbolic spatial–numerical associations and propose directions for future research.

<https://www.nature.com/articles/s44159-026-00591-w>

New Scientist

NEWS

Ancient Egyptian princesses buried with weapons may have been fighters

The mummified daughters of pharaohs who lived thousands of years ago have bone changes that suggest they fought with bows and daggers.

<https://www.newscientist.com/article/2579773-ancient-egyptian-princesses-buried-with-weapons-may-have-been-fighters/>

Congolese monkey with mask-like face and strong BO is new to science

A black colobus monkey from a remote part of the Congo Basin rainforest, known locally as likweli, is thought to be severely threatened by poaching.

<https://www.newscientist.com/article/2579257-congolian-monkey-with-mask-like-face-and-strong-bo-is-new-to-science/>

Queen's powerful smell suppresses rivals in naked mole rat colonies

In naked mole rat colonies, only the queen can breed – and now we have found out how she maintains control.

<https://www.newscientist.com/article/2579526-queens-powerful-smell-suppresses-rivals-in-naked-mole-rat-colonies/>

ARTICLES

KARMELO PADAVIC-CALLAGHAN – Can consciousness be quantum? We may now have an answer

A mathematical analysis suggests that the notion of agency, which is a prerequisite for consciousness, cannot be purely quantum in nature.

<https://www.newscientist.com/article/2579540-can-consciousness-be-quantum-we-may-now-have-an-answer/>

JAMES WOODFORD – Hunter-gatherers introduced fish to a mountain lake 7000 years ago

Many centuries before the advent of agriculture in Norway, ancient people transported fish into mountain lakes to create a source of food, then built wooden traps to catch them.

<https://www.newscientist.com/article/2580119-hunter-gatherers-introduced-fish-to-a-mountain-lake-7000-years-ago/>

MICHAEL MARSHALL – How humans evolved to be twice as big as our ancestors

Artistic representations of ancient humans often show large men with bulging muscles – but our ancestors were actually smaller than us, in both height and body mass.

<https://www.newscientist.com/article/2533221-how-humans-evolved-to-be-twice-as-big-as-our-ancestors/>

Philosophical Transactions of the Royal Society B**PAPERS****LIVIA GERBER et al with STEPHANIE L. KING – A culturally transmitted foraging technique in Indo-Pacific bottlenose dolphins can be predicted by DNA-methylation levels**

Cultural repertoires can influence access to resources and fitness across species, impacting individuals' environmental niches and social networks. Such behaviours may induce potentially reversible changes in gene expression via epigenetic mechanisms like DNA methylation, thus capturing cultural behaviour on a molecular level. Some Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) in Shark Bay, Western Australia, use marine sponges as foraging tools and exhibit differences in diet, sociality and survival compared to dolphins that use the same habitat but lack the tool-using know-how ('non-spongers'). We investigated the relationship between this culturally transmitted behaviour and skin DNA methylation patterns at 29 812 cytosine-phosphate-guanine (CpG) sites of the HorvathMammalMethylChip40. Machine learning models, based on differences in DNA methylation at specific CpG sites, showed moderate ability to discriminate between spongers ($n = 23$) and non-spongers ($n = 73$; area under the curve = 0.68). Permutation tests indicated that our main machine learning model performed significantly better than random at differentiating spongers from non-spongers, suggesting that DNA methylation patterns contain information associated with sponging behaviour. Our study on the nexus between epigenetics and cultural evolution opens a promising avenue of research on the molecular underpinnings of cultural practises, important to the biology of humans and other animals.

<https://royalsocietypublishing.org/rstb/article/381/1955/20250017/482594/A-culturally-transmitted-foraging-technique-in>

JASON KEAGY & ALISON BELL – Dads matter, too: the behavioural and neurogenomic effects of receiving paternal care

The early life environment can strongly influence behavioural development. However, little is known about the underlying neurogenomic mechanisms. Using a half-sib design, threespine stickleback fish were either raised by their fathers or hand-reared ('orphaned') for 10 days before living in a common-garden environment. As offspring developed, they were tested in one of three behavioural assays: an open field assay with a simulated predator attack, a social behaviour assay with a simulated predator attack, and a light–dark box assay. Offspring that received paternal care behaved in ways that we interpret as indicating increased boldness and sociability. Fish in the open field assay had their brains sampled one hour following the simulated attack; brains were sampled at the same time from full-sib controls. These brains were processed for gene expression (via 3'Tag-seq) and chromatin accessibility (via ATAC-seq). Paternal care treatment and the predator attack affected brain gene expression, but sex was also a major factor, despite fish being reproductively immature. Sex, and to a lesser extent, paternal care treatment, also influenced chromatin accessibility at a whole-genome scale. Our findings further our understanding of the mechanisms by which the early life environment—including the environment provided by parents—influences offspring behavioural development.

<https://royalsocietypublishing.org/rstb/article/381/1955/20250015/482603/Dads-matter-too-the-behavioural-and-neurogenomic>

Physics of Life Reviews**PAPERS****ZEFAN ZHENG et al – Loops All the Way Up: Recurrency as an Implementation-first Primitive for Consciousness**

Consciousness science is fragmented, and empirical investigations are largely confined within the framework of each theory of consciousness (ToC). Proliferating ToCs accumulate anomalies without progress, operating orthogonally. The principle of recurrency, functional and architectural, specifies a unifying, mechanistic scaffold for consciousness to arise. We show that all theories tacitly invoke feedback loops and can be re-expressed along a single axis of recursion. Four nested levels, viz., cellular, local inter-areal, global, and lateral, map onto state consciousness, phenomenal (P) content, conscious access (A), and phenomenal character, respectively, thus tying evolved anatomy to phenomenality. The classical P-A distinction dissolves into a graded cascade wherein deeper recursion expands the set of reportable, behaviour-driving variables. Recurrency, defined as structural, causal, and/or functional feedforward and feedback connections between elements within a system, is favoured in biological architectures, and supports the closed-loop interactions between brain, body, and environment that underlie adaptive behaviour and self-related processing. Disparities in the explanatory mechanisms across theories of consciousness can thus be resolved by converging onto this shared principle on the implementation axis, rather than deal

with phenomenal-first or functional-first ontologies. The field urgently requires this implementation-first distillation that is biologically plausible, mechanistic, and empirically testable.

<https://www.sciencedirect.com/science/article/pii/S1571064526000606>

TAO GONG – Language Extinction and Diversification: The Two Sides of the Same Coin

Language extinction and language diversification are not opposing phenomena; they are the same evolutionary process running in two directions. A single multi-level selection framework that spans sub-lexical, feature-pool, population, and machine-mediated scales predicts both divergence and death, and a tractable Pólya-urn simulation shows how identical micro-dynamics flip between the two under one ecological parameter.

<https://www.sciencedirect.com/science/article/abs/pii/S157106452600059X>

PLoS One

PAPERS

JUNHUI WU & ZERUI DAI – Revisiting the grammaticalization of future be going to: A corpus-based approach

Through the quantification of frequency, existing corpus-based quantitative studies on grammaticalization offer a new direction for empirical investigation. However, most existing studies focus on general frequencies, failing to elucidate the relationship between frequency and grammaticalization. The proposition of critical frequency can reveal the relationship between frequency and grammaticalization and confirm the “threshold” that triggers grammaticalization. The present study explores the critical frequency (i.e., synchronic intensity and diachronic thickness) of future be going to and clarifies the relationship between its critical frequency and general frequency based on the corpora of EEBO, Google Books and COCA. The corpora are large enough for tracing the development of the fully grammaticalized be going to. Furthermore, the results retrieved from them can be mutually verified, thereby ensuring the validity of the present study. Quantitative analyses, including Chi-square test and linear regression test, are performed on the retrieved results. The findings include: (1) the diachronic thickness of future be going to lasts for 110 years (i.e., 1580–1690) and the synchronic intensity amounts to 0.81 per million words; (2) The critical frequency and the general frequency of future be going to are closely correlated. The present study confirms the threshold for triggering the grammaticalization of future be going to and elucidates the relationship between its critical frequency and general frequency. This study provides insights for future quantitative research on grammaticalization.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0352674>

SIHUI LI, SIDA KANG & HONGYU LIU – Dynamic analysis of weak prisoner’s dilemma game considering conservative and aggressive cooperative strategy

The balancing of benefits is a critical pathway for maintaining cooperative relationships among selfish individuals within a group. Relevant research has confirmed that the ultimate outcomes of altruistic actions essentially revert to the level of self-interest. This study posits that individuals exhibit heterogeneous cooperative behaviors in social interactions due to differences in cognitive abilities and personality traits; accordingly, conservative cooperative strategy and aggressive cooperative strategy are introduced. Conservative cooperators are characterized by incurring additional identification costs when interacting strategically with other individuals, whereas aggressive cooperators demonstrate a higher level of resource investment to promote the emergence of cooperation. The results indicate that, in infinite well-mixed populations, reducing identification cost and increasing cooperative benefit can, to some extent, promote cooperation. In structured populations, especially under the random neighbor unconditional imitation rule, the relative advantages of the three strategies increase or decrease in a stage-dependent manner as the identification cost and aggressive cooperation cost vary. The research findings confirm that the presence of differentiated cooperative strategies effectively sustains group cooperation, providing new theoretical insights and model support for analyzing the mechanisms of cooperation evolution in real-world scenarios.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0354591>

PNAS

PAPERS

JIALIN LI et al – Continuity in geometric intuition between humans and monkeys

Geometric intuition is regarded as a hallmark of human intelligence. Humans hold a unique advantage in recognizing geometric shapes with Euclidean features (e.g., parallelism, symmetry) and have more sophisticated geometric concepts than nonhuman primates. A popular explanation for this human distinctiveness is that humans rely on discrete, symbolic features to encode geometric shapes, while other primates depend only on continuous perceptual features. The current study challenges this view. We used a match-to-sample task to test whether monkeys share geometric representations with humans. We found that monkeys combined high-level perceptual representations with abstract symbolic representations like humans, suggesting a graded, quantitative continuity in geometric intuition across species rather than a categorical, qualitative divide. Importantly, monkeys showed stronger reliance on symbolic features when processing rotated geometric shapes than preschoolers did with unrotated shapes, indicating that what appears to be symbolic representation may largely

emerge from rotation-invariant encoding. These results challenge the hypothesis of human uniqueness in geometric intuition and suggest that its origins in humans are rooted in abstractions shared with primates.

<https://www.pnas.org/doi/full/10.1073/pnas.2532934123>

Proceedings of the Royal Society B

PAPERS

JAKE S. BROOKER et al with ZANNA CLAY – Reassuring body contact promotes social tolerance in bonobos and chimpanzees

Social tolerance underpins cooperation in humans and other social animals, but its proximate drivers in short-term, competitive contexts remain poorly understood. Reassurance behaviours may enable individuals to pre-empt conflict and signal benign intent, facilitating social tolerance. We tested whether reassuring body contact during anticipation of a collective feeding event promotes cofeeding tolerance in our closest primate relatives. Using a controlled cofeeding paradigm across five semi-wild bonobo and chimpanzee groups (n = 116 individuals), we quantified pre-feeding affiliative contact and measured access to a restricted, depleting food zone. In both species, increased affiliative body contact enhanced subsequent cofeeding tolerance in most groups. Bonobo female–female pairs and chimpanzee male–male pairs engaged in more pre-feeding reassurance than other-sex pairings, aligning with species-specific predictions. However, these trends were only clear for socially tolerant groups. Likewise, vulnerable chimpanzee-specific kissing behaviours were more prevalent in a tolerant group. Our results reveal that reassuring contact may function as a flexible, short-term mechanism to mitigate contest competition and promote group-level tolerance. By identifying a proximate behavioural tool for managing competition in our closest cousins, our findings demonstrate the important role that friendly social behaviours play in negotiating the trade-off between competition and cooperation, as is essential to our own species' survival.

<https://royalsocietypublishing.org/rspb/article/293/2075/20253190/482572/Reassuring-body-contact-promotes-social-tolerance>

BONAVENTURA MAJOLO et al – Evidence of cultural convergence through development for prosocial and antisocial behaviour

Facilitating prosocial behaviour and limiting antisocial behaviour is a fundamental part of maintaining a functional society, and many previous studies have focused on exploring cross-cultural variation within social behaviour. Contrasting hypotheses predict either the convergence or divergence of cultural differences following increased globalization. However, it remains unclear whether cultural differences in prosocial and antisocial behaviour align with the convergence or divergence hypothesis and whether they remain consistent during development. We tested this using a large set (above 27 000) of effect sizes from published dyadic comparisons between cultural groups, for prosocial and antisocial behaviour across multiple age categories (1–18 years old). Overall, we found larger effect sizes for prosocial than antisocial behaviour. Moreover, consistent with cultural convergence, cultural differences decreased with age for males and females. Our results show for the first time that globalization does not only affect adults but can impact social development early in life. We suggest this could reflect a convergence of behaviours and/or a convergence of norms, which further work could explore. We also identified several important biases in the published literature around human social behaviour.

<https://royalsocietypublishing.org/rspb/article/293/2075/20260191/482574/Evidence-of-cultural-convergence-through>

Royal Society Open Science

PAPERS

SARAH ERSKINE & MARK DYBLE – The role of second-order punishers and non-participants in the evolution of altruism through punishment

Altruistic punishment has been hypothesized to be important in the evolution of human cooperative behaviour. Although theoretical models have sought to establish the plausibility of this hypothesis, the empirical validity and robustness of such models remains largely untested. Here, we replicate and extend a prominent deterministic model of the evolution of altruism through punishment by Fowler (Fowler 2005 Proc. Natl Acad. Sci. USA 102, 7047–7049. (doi:10.1073/pnas.0500938102)), exploring parameter sensitivity and varying key assumptions. We find that the evolution of cooperation depends critically on the possibility of voluntary non-participation as a strategy, allowing agents to survive while opting out of the public goods game altogether, as well as the presence of strong second-order punishment, where all first-order punishers are also second-order punishers. Although further modifications to the model allow cooperation to evolve with a low frequency of second-order punishers, the possibility of non-participation remains necessary for altruism to evolve. These results call into question the robustness and empirical validity of this model and stress the importance of exploring the key assumptions of theoretical models.

<https://royalsocietypublishing.org/rsos/article/13/7/rsos260384/482570/The-role-of-second-order-punishers-and-non>

Science

ARTICLES

D. E. BLASI et al – The rise and fall of language diversity through the Holocene

Characterizing the factors that have shaped linguistic diversity is fundamental for understanding human history, culture, and cognition. In this study, we combined statistical and social computational modeling, ethnographic data, and paleodemographic inference to model trajectories of global linguistic diversity. Before the onset of plant and animal domestication, the number of languages was smaller than it is today (4500 to 6000 compared with 7500). Subsequent increases in global population precipitated increased linguistic diversity. We uncovered a linguistic “golden age” with tens of thousands of languages 3000 to 1000 years ago. Great loss of linguistic diversity did not begin with recent colonial expansion but as multinational empires first spread along with their languages, pathogens, and cultures. Thus, extinction has likely played a much greater role in shaping linguistic and cultural diversity than previously thought.

https://www.sciencemagazinedigital.org/sciencemagazine/library/item/23_july_2026/4354026/

Trends in Cognitive Sciences

PAPERS

KELLY JAAKKOLA, STEPHANIE L. KING & JASON N. BRUCK – Do animals use names? Conceptual and empirical criteria

In recent years, several claims have been put forth suggesting that animals of different species address each other using receiver-specific calls that function as individual names. If accurate, this would demonstrate a capacity for symbolic social reference that has rarely been documented in nonhuman communication systems. To evaluate such claims, we propose three minimal criteria for identifying names: individual reference, symbolic representation, and shared meaning. We then review the evidence relevant to these criteria in the species for which name-like calls have been suggested: spectacled parrotlets, common marmosets, African elephants, and bottlenose dolphins. Together, these criteria provide a clear and theoretically grounded framework for exploring the use of name-like calls in nonhuman animals.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(26\)00135-X](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(26)00135-X)

ARSHIYA AGGARWAL & BRENT L. HUGHES – Wired for coherence: a network theory of self

People change across daily situations and life transformations, yet maintain a stable sense of self. Explaining this stability requires understanding how identities, traits, values, and memories interact—what changes together, what resists change, and how. We propose that the self is represented as a dynamic causal network of self-aspects linked by beliefs about how they influence one another. Coherence arises when activated self-aspects align with internal beliefs and contextual demands. When disrupted, the network restores coherence through activation shifts that preserve structure or through structural reorganization that reshapes it. This perspective distinguishes the self from associative, categorical, or hierarchical accounts by specifying directional dependencies that constrain change, and highlights how modifying connections among self-aspects promotes coherence and well-being.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(26\)00157-9](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(26)00157-9)

ROBERTA BIANCO, ROBERT J. ZATORRE & GIACOMO NOVEMBRE – Four missing keystones in the evolutionary origins of music

Music is pervasive across human history, cultures, and development, yet its evolutionary origins remain unresolved due to the interplay of cultural and biological influences. We argue that identifying uniquely human musicality requires cross-primate comparative research that integrates rhythm and melody processing with exposure, computational principles, and intrinsic reward.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(26\)00159-2](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(26)00159-2)

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