

EAORC BULLETIN 1,204 – 12 July 2026

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NOTICES

FORMATTED VERSION OF THIS BULLETIN

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

PUBLICATION ALERTS

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

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

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

EDITORIAL INTERJECTIONS

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

NEWS

JOHN TEMPLETON FOUNDATION – More Awe, More Wonder: Exploring the Mystery of Consciousness

Review of 'A World Appears: A Journey into Consciousness' by Michael Pollan, Allen Lane, 2026.

<https://www.templeton.org/news/more-awe-more-wonder-exploring-the-mystery-of-consciousness>

NATURE BRIEFING – Why humans take long sniffs

Neural activity in the olfactory bulb — the brain area responsible for processing information about smells — follows a steady rhythm that could explain how humans can smell using relatively long sniffs compared to other mammals. Researchers found that a person's sniff triggered a surge in electrical activity called a theta oscillation, which repeats a few times each second. This neural pattern was only activated when people took a deliberate sniff, which suggests that the intention to smell something is what triggers the surge.

<https://www.earth.com/news/scientists-discover-the-brains-hidden-timer-for-smell/>

NATURE BRIEFING – Most preprints contain private info

Nearly all papers posted on the arXiv preprint server contain details the authors never meant to share, according to a study of almost three million articles available on the repository. Some 88% of submissions that contained LaTeX source files included some form of hidden information, including passwords, to-do lists and derogatory comments such as "WTF does this mean?" The findings are "really just the tip of the iceberg," says security and privacy researcher Jan Pennekamp, who co-authored the study.

<https://www.nature.com/articles/d41586-026-02057-8>

SCIENCEADVISER – Early hunter-gatherers had a mammoth craving

If you want to really try the Paleo diet, you will need to ditch the hares and fish and start eating a lot more mammoth. According to a team of archaeologists, the Paleoindians—the first humans to spread across the Americas—specialized in hunting the biggest animals the continents had to offer and paid little mind to smaller, more abundant prey. Researchers have long been divided into two schools of thought regarding the hunting habits of Paleoindians: One camp holds that the ancient humans opportunistically consumed whatever prey they could find, while the other believes that they plotted their lives around hunting the buffalos, mammoths, and giant sloths that once roamed the continents. To dig up the truth, the team synthesized archaeological records from three discrete, widely distributed cultures located in Alaska, North America, and South America. By analyzing the abundance of different animal remains, the researchers revealed that the largest of the large prey—mammoths, giant ground sloths, and elephantlike animals known as gomphotheres—provided over 80% of the meat that Paleoindians consumed. What's more, they found ample evidence that Paleoindians planned around large prey, travelling vast distances to quarry stone that could be honed to a point and affixed to the end of spears and darts. There was no evidence of any smaller traps or nets that could have been used to snare small mammals, fish, or birds. If Paleoindians tailored their lives to following huge mammals, it may explain why these ancient people were so mobile and spread so rapidly across the hemisphere, the authors wrote. In addition, this megafauna-rich diet theory offers an explanation for why the hemisphere's largest mammals all went extinct soon after humans arrived. "Megaherbivores reproduce slowly, space births widely and, as adults, have no natural predators," co-lead author Ben Potter said in a statement. "They would have had no learned wariness of new, technologically sophisticated human hunter-gatherer populations."

<https://www.science.org/doi/10.1126/sciadv.aef9628>

SCIENCEADVISER – 'Hobbit' hominins had hyenalike habits

Measuring in at three-foot-six, 70 pounds and possessing a brain the same size as a chimpanzee's, the extinct human relative *Homo floresiensis* is not known for its strength or its smarts. But since its discovery in the early 2000s, some archaeologists have speculated that the diminutive hominin may have punched above its physical and cognitive weight, including hunting down and cooking the extinct elephant relative *Stelodon* in Indonesian forests over 50,000 years ago. Now, a new study in *Science Advances* calls this supposed sophistication into question.

When *Stelodon* bones bearing deep cuts were found alongside *H. floresiensis* remains and stone artifacts, it was taken as evidence that the "hobbit" hominins had killed their prey. But given how impressive this feat would be for such a petite primate, researchers suspected that Komodo dragons—the island's apex predators—may actually have been responsible. To study how the world's largest lizard feasts, the researchers fed a dead goat to a captive dragon and examined the marks it left behind. They found that the dragon's teeth left scores identical to ones found on the forelimbs and hindlimbs of *Stelodon*—the fleshiest, most appealing parts of the animal. *H. floresiensis* cut marks, by contrast, were more common on the spine and neck bones, which carried much less meat. This suggests that large lizards brought down the elephantlike animals, taking their pick of the spoils and leaving the rest for the hominins to scrounge.

The researchers also found no evidence that *H. floresiensis* used fire, making it likely that they scavenged raw meat like hyenas. While the study's findings indicate the species was less cognitively advanced than previously thought, the researchers note that it was still an impressive survivor. "The fact that they survived isolated on an island until 50,000 years ago without needing to hunt or use fire speaks volumes about their adaptability," said lead author E. Grace Veatch in a statement.

<https://www.science.org/doi/10.1126/sciadv.aeb7219>

SCIENCENEWS – 'Hobbits' likely scavenged dragons' kills

When Bilbo first crept into Smaug's cave in the Lonely Mountain, he helped himself to a cup that was part of the dragon's hoard. Now, examinations of bones from a real-world cave in Indonesia suggest that our "hobbit" relatives also dared to pick at a dragon's haul. *Homo floresiensis* was an ancient human relation that once lived on the Indonesian island of Flores. These small-bodied hominids shared the isle with oversized rats, miniaturized elephants and fierce Komodo dragons. As Jake Buehler reports, analysis of animal remains found with the hobbit fossils hints that our tiny kin were scavenging off prey taken down by the large lizards.

Wait. Hobbits were real? Not exactly. Fossils of *H. floresiensis* showed that adults of the species stood just 1 meter tall, so the species quickly picked up the nickname popularized by J.R.R. Tolkien's fictional characters. Some experts think the hobbits evolved from a larger-bodied ancestor that shrunk due to the "island rule" — over many generations, animals on islands seem to get larger or smaller than their mainland counterparts, depending on the resources available. This rule may also account for the strange sizes of creatures that lived alongside the hobbits, including an elephant relative that was just 1.2 to 1.5 meters tall.

So did hobbits hunt tiny elephants? That's been the theory for years, based on purported cut marks on elephant bones found alongside the hobbits. But when scientists took a closer look at more than 3,000 bone fragments, they saw that the marks don't actually resemble cuts from stone tools. Instead, they look more like tooth marks made by Komodo dragons. The team therefore concludes that hobbits were most likely scavenging off Komodo kills.

<https://www.sciencenews.org/article/hobbits-scavenged-dragon-kills-flores>

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

LEVI Y. RASKIN et al – Principal Components Analysis Fails to Recover Phylogenetic Structure in Hominins

Paleoanthropologists often utilize geometric morphometrics and principal components analysis (PCA) to interpret shape variation within the hominin fossil record. It is common practice to interpret proximity in principal components (PC) space among taxa as indicative of not just morphological but also phylogenetic affinity. This interpretation, however, has not been directly evaluated for hominins.

First, we inferred the posterior distribution of hominin phylogenetic trees and subsampled trees from this distribution. On these phylogenies, we simulated 2D and 3D geometric morphometric datasets and traditional morphological datasets, containing traits analogous to measurements of size or length, with varying numbers of landmarks or traits and evolutionary rates. On each dataset, we conducted a PCA and used neighbor-joining to infer evolutionary relationships from the PC scores of each taxon. We measured the difference between the PCA tree and sampled tree with subtree pruning and regrafting distance and Robinson-Foulds distance.

PCA trees inferred from traditional morphometric data were identical to the sampled tree in 0.11% of datasets when we only considered PC axes 1 and 2, and in 2.9% of datasets when we considered all axes. No PCA tree inferred from any of the 2,400,000 shape datasets was identical to the sampled tree, regardless of the number of axes.

Phylogenetic interpretations of the hominin fossil record based on proximity in PC space are inherently flawed and likely to be erroneous. Arguments in the hominin systematics literature based on PCA, whether implied or explicit, should therefore be reevaluated using phylogenetically informed alternatives.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.70306>

DEAN FALK – Reconsidering Whether Knuckle-Walking Gave Rise to Bipedalism in Light of the Extended Evolutionary Synthesis

Paleoanthropologists debate whether the common ancestor of chimpanzees and humans moved terrestrially by knuckle-walking or in some other manner preadapted for bipedalism. The answer to this question would shed light on the emergence of one of the most definitive features of early hominins—habitual terrestrial bipedalism. Comparative morphological studies of apes, australopithecines, and modern humans, and investigations of the few putative earliest hominins have failed to resolve this issue. Here, the knuckle-walking question is approached by comparing the ontogenetic development of locomotor milestones in extant humans and chimpanzees in view of the extended evolutionary synthesis (EES), which extends the traditional modern synthesis' relatively narrow focus on natural selection and genetics by considering the plurality of factors that influence evolutionary processes, including development, organism-environment interactions, and epigenetics. Although the neuromuscular development of locomotor milestones is similar in chimpanzees and humans,

chimpanzees do not crawl on their hands and knees, and human babies do not knuckle-walk. Palmigrade quadrupedalism briefly precedes development of knuckle-walking in chimpanzees. Converging data suggest that hands-and-knees crawling in hominin infants derived from a developmentally driven evolutionary transformation of chimpanzee-like palmigrade quadrupedalism in response to the progressive elongation of legs that accompanied selection for bipedalism. Modern human behaviors such as knocking on doors and boxing reinforce the hypothesis that hominins are, indeed, descended from knuckle-walkers.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.70301>

eLife

PAPERS

LEONARDO CERAVALLO et al – Sensitivity of the human temporal voice areas to nonhuman primate vocalizations

In recent years, research on voice processing in the human brain, particularly the study of temporal voice areas (TVA), was dedicated almost exclusively to conspecific vocalizations. To characterize commonalities and differences regarding primate vocalization representations in the human brain, the inclusion of closely related nonhuman primates, namely chimpanzees and bonobos, is needed. We hypothesized that neural commonalities would depend on both phylogenetic and acoustic proximities, with chimpanzees ranking closest to Homo. Presenting human participants (N=23) with the vocalizations of four primate species (rhesus macaques, chimpanzees, bonobos and humans) and regressing-out relevant acoustic parameters using three distinct analyses, we observed within-TVA, sample-specific, bilateral anterior superior temporal gyrus activity for chimpanzee vocalizations compared to: all other species; nonhuman primates; human vocalizations. Within-TVA activity was also observed for macaque vocalizations. Our results provide evidence for subregions of the TVA that respond principally, but not exclusively, to phylogenetically and acoustically close nonhuman primate vocalizations, namely those of chimpanzees.

<https://elifesciences.org/reviewed-preprints/108795>

MICHAEL C FRANK et al – Continuous developmental changes in word recognition and language learning across early childhood

Being a fluent language user involves recognizing words as they unfold in time. How does this skill develop over the course of early childhood? And how does facility in word recognition relate to the growth of vocabulary knowledge? We address these questions using data from Peekbank, an open database of experiments measuring children's eye movements during early word recognition. In an observational study of 26 datasets from over 2500 children ages 6 months to 6 years, we show that word recognition becomes faster, more accurate, and less variable across development, consistent with a process of skill learning. Factor analysis reveals covariation of word recognition speed and accuracy with children's vocabulary size in cross-sectional analysis. Further, across a range of longitudinal models, speed, accuracy, and vocabulary were coupled. Children with overall faster word recognition tended to show faster vocabulary growth, though developmental growth in word recognition skill was not specifically associated with growth in vocabulary. Together, these findings support the view that word recognition is a skill that develops gradually across early childhood and that this skill is deeply intertwined with early language learning.

<https://elifesciences.org/articles/109636>

Evolutionary Anthropology

PAPERS

FRANCESCO D'ERRICO & SOLANGE RIGAUD – The Origins of Fashion

This paper reconceptualizes fashion as a deep-time system of bodily communication rather than a byproduct of modern consumer societies. We define fashion as a socially transmitted system of bodily display in which patterned variation occurs within shared conventions of appearance. Archaeologically, fashion becomes identifiable when recurring forms of body modification and ornamentation coexist with socially meaningful differences in their selection, combination, and arrangement. From this perspective, fashion emerged through the long-term culturalization of the human body, whereby appearance became an increasingly important medium for communicating identity, affiliation, status, and social relationships. Archaeological evidence suggests that this process began at least 400,000 years ago with pigment use, intensified with the emergence of personal ornaments, and developed into regionally differentiated systems of bodily display during the Upper Paleolithic, Neolithic, and Metal Ages. Drawing on archaeological, anthropological, and cognitive approaches, we interpret this trajectory as a cultural evolutionary process involving the generation of novel forms of bodily variation, their transmission through socially learned conventions, and their persistence, transformation, or disappearance under changing social and economic conditions. We argue that fashion functioned as an externalized social memory system that reduced cognitive demands by embedding social information in material form. In this sense, fashion emerged as a cultural technology that made social information increasingly visible, interpretable, and transmissible through bodily display.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.70039>

ADRIANO R. LAMEIRA – Silence as an Overlooked Catalyst for Primate Vocal Evolution

Language is inherently relational, prompting comparative studies to prioritize social, gregarious, and voluble primates as evolutionary models. By prevailing theory, solitary and dispersed primates ought to be silent or communicatively impoverished, but this is often presumed, not empirically verified, with these species' capacities seldom being brought to bear on evolutionary theories based on social drivers. This skewed sampling could mask other valuable but hitherto disregarded sources of information and inference obfuscated by the spotlights of the social stage. Orangutans—the only hominids living without permanent social groups—are also the only nonhuman primate known to share with humans two hallmark features of language: displaced vocal reference (where mothers delay alarm calls to teach offspring about past predator encounters) and vocal hierarchies (with vocal motifs nested in self-similar motifs). The description of such traits in the most private and reserved great ape highlights a hidden precondition for vocal evolution: extended and elaborated vocal patterns and functions, which epitomize vocal sophistication, are time-sensitive and require attentive listening without interruption for correct processing. The functional benefits of elaborate and complex sound combinations partly depend on receivers being capable of vocal suppression and impulse control in response to others. Conversely, species with frequent, rapid and reactive social chatter incur “town square taxes” that interrupt and constrain, rather than promote, vocal elaboration and complex patterning. Silence remains a critical but undertheorized resource for fostering communicative and cognitive sophistication, helping reframe the (a)social prerequisites for primate vocal evolution and the emergence of language amongst ancestral hominids.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.70040>

Frontiers in Education**PAPERS****SOLEDAD CARRETERO et al – Teacher–infant interactions in early childhood education and care: a review from an embodied, intersubjective, and multimodal perspective**

This narrative review examines multimodal interactions between teachers and infants and toddlers aged 0–3 years in Early Childhood Education and Care (ECEC) settings. It focuses on dyadic teacher–infant interactions from embodied and intersubjective perspectives, with particular attention to nonverbal and prelinguistic forms of exchange. Early communication is inherently multimodal, integrating visual, tactile, rhythmic, vocal, and affective dimensions. This perspective has gained relevance in recent decades, partly through the development of embodied approaches in developmental psychology and, more specifically, through the framework of communicative musicality. However, although educational quality during the first years of life depends substantially on teachers' relational competence and responsiveness, research in educational settings remains limited compared with the extensive literature on adult–infant interaction in family contexts. The findings indicate that the field is still incipient, with a clear predominance of qualitative, especially ethnographic, studies and limited use of quantitative, longitudinal, and microanalytic designs. Key gaps include the scarcity of research on children under one year of age and the methodological complexity of analyzing both dyadic and group dynamics in ECEC. The review argues that strengthening empirical research and incorporating tools such as video feedback may improve teacher education and educational practice. Future studies should examine how educators sustain intersubjective connection through multimodal resources such as gaze, proximity, bodily orientation, rhythm, and affect attunement, while also exploring care routines as privileged contexts for early interaction.

<https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2026.1837905/full>

Frontiers in Psychology**PAPERS****ALEXANDER NEAMAN et al – Helping people, neglecting soil: contrasting effects of emotional empathy with humans on altruistic behaviour and soil conservation in a population of Chilean farmers**

The empathy-altruism hypothesis posits empathy is a pre-requisite for altruistic behaviour. Similarly, proposed an empathy-sustainability hypothesis, suggesting empathy is a pre-requisite for sustainable interactions with nature. However, the existing literature tends to intermix the concepts of empathy with humans and empathy with nature. In this study, we aimed to assess the effects of emotional empathy with humans on altruistic behaviour and soil conservation behaviour, in a population of Chilean farmers ($n = 234$). Although the findings of the present study support the empathy-altruism hypothesis ($r = 0.49$), they do not support the empathy-sustainability hypothesis, since a negative correlation emerged between emotional empathy and soil conservation behaviour ($r = -0.24$). This correlation was pronounced in male farmers ($r = -0.37$) and not in female counterparts ($r = -0.08$). The present study suggests that fostering emotional empathy with humans may not be helpful in solving current soil degradation issues.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2026.1843293/full>

iScience

PAPERS

ZIHANG ZHOU et al – Domain-general and language-specific brain networks are differentially associated with verbal intelligence during development

Understanding how verbal intelligence develops requires clarifying the roles of domain-general and language-selective brain systems. Here, we examined this question in an accelerated longitudinal cohort of children and adolescents from Beijing (N = 170) by relating gray matter volume measures to the verbal comprehension index (VCI) of the Wechsler intelligence scale, a widely used measure of verbal intelligence. We observed that individual differences in VCI were more strongly associated with structural maturation of domain-general networks, including the default mode (DM) and multiple-demand (MD) systems, than with the language-selective network, and that these effects varied with age. Independent validation in a Chongqing cohort (N = 150) confirmed significant contributions of domain-general networks during adolescence (13–15 years). These findings highlight a previously underappreciated role of domain-general cortical systems in the development of verbal intelligence during adolescence and provide new insight into the neural basis of abstract verbal reasoning across development.

[https://www.cell.com/iscience/fulltext/S2589-0042\(26\)02080-8](https://www.cell.com/iscience/fulltext/S2589-0042(26)02080-8)

ANASTASIA MORANDI-RAIKOVA, MIRKO ZANON & GIORGIO VALLORTIGARA – The naive brain detects face-to-face biological motion

Detecting agents and their interactions is a cornerstone of social cognition. Vertebrates are known to possess innate sensitivity to animacy cues, such as self-propelled or biological motion, supported by subpallial circuits within the social behavior network (SBN). However, the neural mechanisms distinguishing the detection of animate motion from the recognition of socially meaningful relations remain unclear. Using visually naive female domestic chicks, we investigated the brain regions activated when observing point-light displays of hens moving face-to-face or back-to-back, a behavioral paradigm previously shown to reveal spontaneous sensitivity to social interaction. We found selective immediate early-gene expression in the nidopallium caudolaterale, homologous to the mammalian prefrontal cortex, but not in the nucleus taeniae of the amygdala and septum, subpallial areas in the SBN. This pattern suggests that while basic sensitivity to animate motion may rely on evolutionarily ancient subpallial circuits, the detection of socially relevant relations engages higher order pallial processing.

[https://www.cell.com/iscience/fulltext/S2589-0042\(26\)02071-7](https://www.cell.com/iscience/fulltext/S2589-0042(26)02071-7)

Mind & Language

PAPERS

VICTOR URINI – The determination of what is said and what is implied

Is what is said determined by syntax, conventional meaning, and select aspects of context? This thesis—semanticity—seems plausible because what is said can diverge from both what the speaker means and what the addressee understands, and because ordinary speakers know what is said when presented with a novel sentence-context pair. I argue that semanticity is actually not the best explanation of these properties, because what is implied shares them. I then explain this commonality: What is said and what is implied are similarly determined by the interpretation of an addressee defined in terms of the context.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.70040>

Nature

ARTICLES

DYNA ROCHMYANINGSIH – ‘This time, it’s the other way around’: how Indonesia is reclaiming the science of human history

After a massive restructuring of its research ecosystem, Indonesia is taking the lead on its own palaeontological research.

<https://www.nature.com/articles/d41586-026-01357-3>

Nature Communications

PAPERS

SEUNG-CHEOL BAEK et al – Dynamic acoustic-to-categorical representations of phonemes and prosody along ventral and dorsal speech streams

Phonemes and prosodic contours are fundamental elements of speech used to convey complementary meanings. Perceiving these elements requires mapping variable acoustic cues onto discrete categories along ventral and dorsal speech streams. While traditional models make clear predictions, exactly where and when this acoustic-to-categorical mapping occurs remains unclear. Using magnetoencephalography and behavioural psychophysics, combined with time-resolved representational similarity and multivariate transfer entropy analyses, we show how phonemes and prosody propagate along the dual streams and how their categorical representations are gradually formed. Contrary to theoretical predictions, acoustic and categorical representations occur in parallel, rather than serially, across time and space for both elements.

Moreover, prosody categories extend further along both streams than phoneme categories, with differently weighted contributions of posterior temporal areas. These results highlight a shared principle of parallel acoustic and categorical processing, yet partially distinct abstraction mechanisms for phonemes and prosody, key to access the multilayered meaning of speech.

<https://www.nature.com/articles/s41467-026-75240-0>

MARK HUBBE & KATERINA HARVATI – Evolutionary drivers of encephalization and facial reduction in the genus Homo

The evolution of cranial morphology in the genus Homo is marked by increasing encephalization and reduced facial robusticity through time. These changes are often assumed to be the product of directional natural selection for larger brain size, presumed to be associated with greater cognitive abilities, and for decreasing facial size to lower energetic costs, as masticatory demands were reduced through food processing and tool use. Here, we test this hypothesis by exploring the goodness-of-fit of the predictions of six evolutionary processes to the observed cranial morphological variation in Homo. We analyzed comprehensive neurocranial and facial 3D landmark coordinate datasets, grouped into eight Operational Taxonomic Units starting with early Homo and representing two lineages, Homo sapiens and Homo neanderthalensis. Our neurocranial analysis found strongest support for models of neutral evolution (Unbiased Random Walk) and stasis across both lineages. Similarly, the face shows strongest support for models of stasis, strict stasis, and neutral evolution (Unbiased Random Walk). Our findings suggest a limited role for gradual directional selection and underscore the importance of stabilizing selection and constraints in our lineage's evolution, highlighting the importance of environmental constraints and possibly cultural behaviors as core drivers of human evolution.

<https://www.nature.com/articles/s41467-026-74739-w>

LYNN K. A. SÖRENSEN, JAMES J. DICARLO & KOHITU KAR – Hierarchical optimization predicts plasticity in the macaque inferior temporal cortex following object training

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

How does the primate brain coordinate plasticity when learning to discriminate new objects? We measured consequences of object learning on inferior temporal (IT) cortex, a key waypoint supporting object recognition in the ventral visual stream, in male macaques. Neural activity in task-trained monkeys' IT showed increased object selectivity, enhanced linear separability across objects, and more object-invariant representations compared to task-naïve monkeys. To model these differences, we developed a computational framework using anatomically-mapped artificial neural network (ANN) models of the ventral stream with various learning algorithms. Simulations revealed that gradient-based, performance-optimizing updates of ANN internal representations accurately approximated observed IT cortex changes. These models predict novel training-induced phenomena in the IT cortex, including changes independent of object identity and IT's alignment with behavior. This convergence between empirical measurements and model predictions suggests ventral stream plasticity follows task optimization principles well-approximated by gradient descent, enabling accurate predictions about visual plasticity and generalization to test images.

<https://www.nature.com/articles/s41467-026-74816-0>

Nature Human Behaviour

ARTICLES

TOBIAS GROSSMANN – Two roads to prosociality

A large-scale study reveals that children as young as three years old show stable prosocial intuitions when making social decisions. As children grow older, deliberative reasoning increasingly supports prosocial choices, and converges with intuition by the age of eight — thus illuminating how gut feelings and reflective thought jointly shape the development of human cooperation.

<https://www.nature.com/articles/s41562-026-02442-3>

PAPERS

FRANCESCO MARGONI et al – Stable intuition and the rise of deliberative prosociality in childhood

We examine how social behaviours emerge and stabilize across childhood. A sample of 537 Italian-speaking children (3–10 years) were randomly assigned to respond under time pressure (intuitive) or time delay (deliberative) in social decision tasks (Public Goods, Dictator, Ultimatum, Deception and Moral Dilemmas). Factor analysis identified three latent dimensions: Prosociality (cooperative, altruistic and honest actions), Social Optimism (beliefs about others' cooperation) and Acquiescence (tendency to accept offers). Intuitive responses were more prosocial than deliberative ones in early childhood ($\beta = 0.66$; 95% CI = (0.35, 0.97)), but this difference diminished with age ($\beta = -0.11$; 95% CI = (-0.18, -0.05)). We found no evidence that Social Optimism varied across age or decision mode, whereas Acquiescence declined with age ($\beta = -0.14$; 95% CI = (-0.19, -0.10)). These findings suggest a developmental shift whereby prosocial behaviour is initially driven by intuitive responses and gradually becomes embedded within reflective, deliberative decision-making systems, as cooperative dispositions stabilize across childhood.

<https://www.nature.com/articles/s41562-026-02487-4>

Nature Scientific Reports

PAPERS

SILKE M. GÖBEL et al – Number comparison in bilinguals is not affected by their second language

Language background can show subtle effects on number comparison even with Arabic digits. Number pairs can be decade-unit compatible, i.e. the decision about number size is the same for unit and decade (e.g. 24 and 57, $2 < 5$ and $4 < 7$), or decade-unit incompatible (e.g. 29 and 57, $2 < 5$ but $9 > 7$). Incompatible pairs often lead to longer response times. This compatibility effect is larger in languages with number word inversion (e.g. German). We aimed to investigate the influence of language on the compatibility effect in bilinguals. In Experiment 1, we compared the compatibility effect in German monolinguals and German-English bilinguals. We found a significant compatibility effect, but no significant differences between the mono- and bilinguals. In Experiment 2, we manipulated language activation within participants by asking German-English bilinguals to describe scenes either in English or German before completing number comparison trials. There was a significant cost of switching languages, showing that participants did activate German and English. However, the size of the compatibility effect was not significantly influenced by participants activating German or English. Overall, we did not find an influence of a bilingual's language on number comparison with Arabic digits.

<https://www.nature.com/articles/s41598-026-52236-w>

COMMENTARIES

TSENKA TSANOVA, PETR ŠKRDLA & YURI E. DEMIDENKO – Lack of evidence for Initial Upper Paleolithic attribution at Cueva Millán in Iberia's hinterland

replying to: P. Sánchez-Yustos et al; Scientific Reports <https://doi.org/10.1038/s41598-024-69913-3> (2024).

Sánchez-Yustos et al. investigated lithic assemblage from Cueva Millán and propose its classification as a southern European manifestation of the Initial Upper Paleolithic (IUP, ~50–40 kya cal BP). This paper critically evaluates that classification against the IUP, a technocomplex whose foundational phase is the Early Emiran in the Levant, defined by distinct blade technology with Levallois features and associated with Homo sapiens dispersal across Eurasia. The Cueva Millán assemblage lacks diagnostic IUP technological markers and exhibits predominantly Middle Paleolithic (MP) features, including Levallois-based core reduction and MP tool types. Such misclassification risks conflating MP and IUP techno-cultural units, thereby obscuring our understanding of the Neanderthal-to-H. sapiens transition.

<https://www.nature.com/articles/s41598-026-55585-8>

POLICARPO SÁNCHEZ YUSTOS – Reply to: Lack of evidence for Initial Upper Palaeolithic attribution at Cueva Millán in Iberia's Hinterland

In their Matters Arising, Tsanova et al. interpret the lithic assemblage from Cueva Millán Layer 1 (Millán 1) as Middle Palaeolithic (MP). They contrast this with what they incorrectly present as our attribution of Millán 1 to the Initial Upper Palaeolithic (IUP) and, by extension, to an early expansion of Homo sapiens into Iberia. However, our work neither classified Millán 1 as an IUP-type assemblage nor associated it with a specific species. Here, we clarify our conceptual framework and classification proposal and demonstrate that their arguments for a MP attribution are not empirically supported.

<https://www.nature.com/articles/s41598-026-58757-8>

New Scientist

NEWS

Babies are born with the neural foundations for maths

Brain recordings from newborns reveal the first neural evidence that humans are born with an innate sense of numbers.

<https://www.newscientist.com/article/2532352-babies-are-born-with-the-neural-foundations-for-maths/>

ARTICLES

THOMAS LEWTON – Occam's razor has lost its edge. Can we sharpen our search for truth?

Seeking out the simplest, most elegant explanations has served scientists well for centuries, but cognitive scientist Marina Dubova's experiments are revealing better ways to uncover reality.

<https://www.newscientist.com/article/2531862-occams-razor-has-lost-its-edge-can-we-sharpen-our-search-for-truth/>

MICHAEL MARSHALL – Human brains may have got bigger for no particular reason

Our brains are large compared with other animals, so it is tempting to assume there was an evolutionary advantage to them – but that may not be true at all.

{If a trait has no evolutionary advantage to have evolved, then that, by itself, is an evolutionary disadvantage. The trait is in energy competition with other traits which do have advantages, therefore purposes.}

<https://www.newscientist.com/article/2532890-human-brains-may-have-got-bigger-for-no-particular-reason/>

CHRIS SIMMS – Orangutan mothers seem to plan playdates for their offspring

Female orangutans are generally solitary, but they travel more and eat less in an apparent effort to ensure their offspring have someone to play with.

<https://www.newscientist.com/article/2532880-orangutan-mothers-seem-to-plan-playdates-for-their-offspring/>

JAMES WOODFORD – ‘Hobbit’ hominins scavenged meat left over by Komodo dragons

An experiment that involved feeding a dead goat to a Komodo dragon as well as an analysis of thousands of ancient bones suggests that *Homo floresiensis* was neither a skilled hunter of big game nor a master of fire.

<https://www.newscientist.com/article/2532777-hobbit-hominins-scavenged-meat-left-over-by-komodo-dragons/>

COLIN BARRAS – Childbirth for many primate species is even harder than for humans

For decades, we’ve thought that childbirth is uniquely challenging for humans, but it turns out that many other primates find the birth process just as difficult.

<https://www.newscientist.com/article/2532191-childbirth-for-many-primate-species-is-even-harder-than-for-humans/>

Proceedings of the Royal Society B

PAPERS**DANIEL HUGO ASLAN et al – Cognitive demands of bipedal locomotion during human foraging**

Human foraging requires cognitive and physical demands that influence each other. These demands include challenges of staying upright while walking bipedally in complex environments, along with other cognitive tasks (e.g. navigation, executive functions). The combination of cognition and movement is known as cognitive–motor dual-tasks, which can result in declines in performance. However, the influence of cognitive–motor dual-tasks has not been observed in ecologically relevant settings. By using a laboratory-based experiment with 45 healthy participants, as well as observations from foraging bouts with the Hadza, a hunter–gatherer population living in northern Tanzania, we tested the hypothesis that walking over uneven terrain and cognitive challenges interfere with both locomotor and cognitive performance. In the laboratory-based experiment, walking over uneven terrain and walking with the cognitive–motor dual-task were associated with a reduction in stride frequency. Additionally, dual-task walking was associated with worse cognitive performance on both the flat surface and a further reduction on the uneven surface. In Hadza participants, engaging in verbal communication and walking over uneven terrain were negatively associated with stride frequency. Our findings highlight the interplay between cognition and locomotion in ecologically relevant foraging contexts, suggesting that cognitive demands may serve as a constraint on human mobility in complex environments.

<https://royalsocietypublishing.org/rspb/article/293/2074/20252615/482460/Cognitive-demands-of-bipedal-locomotion-during>

HARRY F. SUTER, ANDREW N. RADFORD & ALASDAIR I. HOUSTON – Self-control: changing our perspective on performance

To measure self-control in non-human animals, subjects are typically tested on how long they will wait for a larger–later food reward instead of taking a smaller–sooner food reward. Animals that wait longer are deemed to have exhibited better self-control. We develop an optimal foraging model to show that waiting for longer for a larger–later food reward does not always increase fitness whereas minimizing the difference between predicted and observed wait times does—a measure we propose as a novel performance metric. We use our model to generate qualitative predictions that capture trends in wait times observed in empirical studies across species. Moreover, we show that, all else being equal, waiting time increases with basal metabolic rate. Together, our results suggest that variation in wait times may be better understood in the context of animals attempting to meet their individual metabolic demands rather than an inability to wait. Our work raises questions about a large body of empirical support for key hypotheses in cognitive evolution, while our novel performance metric provides a framework for future empirical work to compare self-control appropriately between species.

<https://royalsocietypublishing.org/rspb/article/293/2074/20260488/482461/Self-control-changing-our-perspective-on>

Science

PAPERS**NARUTOSHI SUTO et al – Neural circuits for valence updating in social memory**

Social animals recognize familiar conspecifics and selectively avoid harmful ones. As social relationships shift, continuous updating of social valence is essential, yet the underlying neural mechanisms remain unclear. Here, by artificially transforming a previously neutral conspecific into an aggressive one, we show that valence updating depends on enhanced synaptic connectivity and physiological changes within the hippocampal ventral CA1 (vCA1)–basolateral amygdala (BLA)–nucleus accumbens (NAc) circuit. Following defeat, social memory engram neurons in the vCA1 strengthened their connections with BLA neurons carrying negative valence. The vCA1–BLA–NAc neural circuit flexibly regulates adaptive social behaviors.

<https://www.science.org/doi/10.1126/science.adx8231>

LAURITZ MIARKA & MARCO PRINZ – Antibodies sculpt adult brain circuits: Immune cells target hyperactive neurons to eliminate synaptic connections

During development, the mammalian brain forges more neuronal connections, or synapses, than needed. Excess synapses are tagged by the complement system (1), triggering their elimination by microglia, the tissue-resident macrophages (2). The remaining synapses are strengthened and neuronal circuits mature. During neurodegeneration, this developmental program is reactivated and leads to pathological synapse loss and cognitive decline (3). Whether similar mechanisms shape circuits in the adult brain in the absence of disease is not known. On page 166 of this issue, Crowley et al. (4) reframe developmental, complement-mediated synaptic pruning as a constitutive sensor of neuronal hyperactivity in the adult brain. Neuronal hyperactivity recruits antibody-secreting plasma cells to the hippocampus. Locally produced antibodies [immunoglobulins (Igs)] then facilitate complement deposition on synapses as a cue for engulfment by microglia. The finding reveals an unexpected interface between resident innate immunity of the central nervous system (CNS) and peripheral adaptive immunity in synaptic pruning.

<https://www.science.org/doi/10.1126/science.aei8076>

REVIEWS**NATHAN H. LENTS – What do we know about sex? It depends on whom you ask**

Review of ‘Poking the Squid: What we can learn from Animal sex’ by Perrin Roosevelt Ireland, Norton, 2026; And ‘On the Origin of Sex: The weird and wonderful science of reproduction’ by Living Sun, Basic Books, 2026.

<https://www.science.org/doi/10.1126/science.aeg8740>

Trends in Cognitive Sciences**ARTICLES****NICOLAS W. SCHUCK, MARIT PETZKA & STEPHEN M. FLEMING – What can we learn from studying replay in humans?**

Noninvasive methods are making it possible to study neural replay in humans. Although focused on alignment with rodent findings, human research often tacitly assumes that replay is linked to conscious, deliberate thought. This assumption represents a missed opportunity to investigate the links between replay and consciousness, as well as cross-species differences more broadly.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(26\)00140-3](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(26)00140-3)

TOBIAS GROSSMANN – Rethinking Neanderthal–human divergence

Recent discoveries from Been et al., Schoenemann et al., and Verheijen et al. challenge our understanding of Neanderthals. Their brains appear more human-like than previously believed, and their hunting is cooperative and well organized. Yet their infants may have developed more rapidly. What made modern humans distinctive might be a prolonged childhood.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(26\)00110-5](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(26)00110-5)

PAPERS**SARAH MATHEW & ROBERT BOYD – Rethinking reciprocity**

Reciprocity theory holds a hallowed status in evolutionary social sciences because it provides a way to explain cooperation among unrelated individuals. Theorists have developed a large body of mathematical work based on the iterated prisoner’s dilemma game that explores which strategies are evolutionarily stable in a range of conditions, including scenarios involving behavioral errors. However, there is a mismatch between the vigorous pace of theoretical research and the trickle of empirical studies that have tested predictions generated by the theoretical work. Furthermore, findings from the empirical work on dyadic cooperation in humans diverge from theoretical predictions in significant ways. This discrepancy indicates that the standard theoretical framework is poorly equipped to account for key aspects of real-world cooperation. To better align with real-world observations, theoretical explorations of reciprocity need to shift their focus toward understanding how actors choose partners and maintain relationships.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(26\)00134-8](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(26)00134-8)

MICHAEL PLEYER et al with MARCUS PERLMAN & GARY LUPYAN – The ‘design features’ of language revisited

Language is often regarded as a defining trait of our species, but what are its core properties? In 1960, Hockett published ‘The origin of speech’ enumerating 13 design features presumed to be common to all languages, and which, taken together, separate language from other communication systems. Here, we review which features still hold true in light of new evidence from cognitive science, linguistics, animal cognition, and anthropology, and demonstrate how a revised understanding of language highlights three core aspects: that language is inherently multimodal and semiotically diverse; that it functions as a tool for semantic, pragmatic, and social inference, as well as facilitating categorization; and that the processes of interaction and transmission give rise to central design features of language.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(25\)00279-7](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00279-7)

TALYA SADEH, LILACH LIEBERMAN & IAN G. DOBBINS – How do we evaluate and learn from others' memories?

A fundamental question regarding the human mind is how we derive knowledge from others' episodic memories, to learn about things we did not experience directly. This learning is vital for understanding the world around us and guides our actions and decisions. We propose a novel framework to investigate how people learn from others' episodic memories, hypothesizing that in such learning, people take an evaluative stance to avoid acquiring misleading information. Information evaluated as more veridical will be more likely to be learned from. We review the cues used to evaluate others' memories. These cues may be conveyed and interpreted automatically (e.g., various aspects of prosody), or more deliberately (e.g., description of recollective content, overt metacognitive claims of certainty or specificity).

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(25\)00277-3](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(25)00277-3)

A. ROSS OTTO, ANDREW WESTBROOK & JEAN DAUNIZEAU – Why is cognitive effort experienced as costly?

A widespread observation is that people avoid mentally effortful courses of action, and much recent work examining cognitive effort has explained subjective effort evaluation – and, consequently, preferences – in economic terms, which assumes that the expenditure of cognitive effort is experienced as costly. However, this economic perspective is largely tacit about the source of these costs. Here, we review recent theoretical treatments of effort costs, which take vastly different perspectives (information-theoretic, psychological, and biological) to explain how the subjective experience of cognitive effort arises from controlled information processing, exploring their predictions concerning the simple observation that people experience tasks with high (versus low) working memory demands as costly. Finally, we identify open questions that might help bridge across these accounts.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(25\)00287-6](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00287-6)

VICTORIA GUAZZELLI WILLIAMSON, NICHOLAS B. ALLEN & JENNIFER H. PFEIFER – Multidimensional social cognitive profiles: implications for adolescent internalizing psychopathology

Adolescence is a period of vulnerability for internalizing mental health disorders. One underappreciated mechanism of internalizing psychopathology is higher-order social cognition (i.e., cognitive processing of information about the self and others), which is highly salient during adolescence. We propose that the protracted development of social cognition during adolescence results in highly individualized, multidimensional profiles that can be characterized across four core dimensions (Propensity, Degree, Positivity, and Negativity). A social cognitive profile with greater Propensity, Degree, and Negativity, and decreased Positivity, along with associated decreases in Accuracy, may confer greater risk for internalizing psychopathology, particularly if applied inflexibly across contexts. Future research may test the utility of these profiles for stratification, prediction, or intervention targeting.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(26\)00137-3](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(26)00137-3)

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