

EAORC BULLETIN 1,107 – 1 September 2024

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NOTICES

PUBLICATION ALERTS

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

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

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

EDITORIAL INTERJECTIONS

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

NEWS

FOREIGN AFFAIRS – Sapiens in the Mist

What the Fight About Humanity’s Origins Reveals About Its Future.

<https://www.foreignaffairs.com/reviews/sapiens-mist>

JOHN TEMPLETON FOUNDATION – Are the Laws of Nature Constant?

The ‘Grantee Voices’ series features contributions from our remarkable grantees. This article was written by Dr. John K. Webb, who is a Professor of Astrophysics at the University of Cambridge. We see the world around us in a constant stage of change, at scales both large and small. Stellar nurseries create new stars that serve fundamental life-enabling functions, then eventually die. Planets are ubiquitous, but they are not immortal either. Human beings, during their brief lifespans, strive to change the world they inhabit. Essentially nothing in human experience seems eternal, and yet our most widely used theories of physics are built on assumptions of immutability. There is, of course, a perfectly good reason: simple assumptions make the development of predictive mathematical theories easier, while complex assumptions make weak foundations, and in some cases undermine predictability entirely.

<https://www.templeton.org/news/are-the-laws-of-nature-constant>

NATURE BRIEFING – Stone Age builders had engineering savvy

The Neolithic farmers and herders who built a massive stone chamber in southern Spain nearly 6,000 years ago seem to have possessed a good rudimentary grasp of physics, geometry, geology and architectural principles. Using data from a high-resolution laser scan, as well as unpublished photos and diagrams from earlier excavations, archaeologists pieced together a probable construction process for the monument known as the Dolmen of Menga. “They understood how to fit together huge blocks of stone” with “a precision that would keep the monument intact for nearly 6,000 years”, says archaeologist and study co-author Leonardo García Sanjuán. “There’s no way you could do that without at least a basic working knowledge of science.”

<https://www.nature.com/articles/d41586-024-02776-w>

NATURE BRIEFING – Dolphin attacks might be play gone wrong

A rise in dolphin attacks at beaches in Fukui Prefecture, Japan could be down to just one male Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) — who might be trying to play. “Gentle biting is a behaviour that we see often among male bottlenose dolphins in the wild,” says dolphin ecologist Tadamichi Morisaka. “They do this to maintain the relationship — in this dolphin’s mind, he might have already built a friendly relationship with humans.” Local authorities have tried to dissuade dolphins by playing a mishmash of disconcerting underwater sounds near the beaches, but Morisaka would like to see an echolocation-detection system that warns people to get out of the water so that the dolphin gets bored and doesn’t return.

<https://www.nature.com/articles/d41586-024-02783-x>

NATURE BRIEFING – The newest bits of our brains age first

Regions of the human brain that are the last to mature, such as parts of the frontal lobe, are the first to show signs of ageing, a theory known as ‘last in, first out’. New research shows that some of these regions are also the ones that evolved most recently — those linked to decision-making and self-control. The results tend to support the “important hypothesis that our cortical expansion came at the price of age-related decline”, says neuroscientist Rogier Mars.

<https://www.nature.com/articles/d41586-024-02784-w>

SCIENCEADVISER – 6000-year-old megalith a monument to ancient science & genius of Neolithic people

In southern Spain stands a giant, earth-covered monument, upheld by gargantuan stone blocks and pillars, that has withstood 6000 years of rain, wind, and earthquakes. The Dolmen of Menga has puzzled archaeologists with two simple questions: How did ancient architects design such a sturdy structure, and how did ancient builders manage construction materials weighing over 1140 tons?

“Perhaps we miscalculate the amount of intelligence that [Neolithic people] had,” says Alex Torpiano, an architect and structural engineer who was not involved in the study. Monuments like Menga, he says, “are lessons not to think that we are the greatest civilization ever.”

<https://www.science.org/content/article/builders-massive-ancient-monument-understood-science-behind-their-work>

SCIENCEADVISER – Does Polly want a crackah? Parrots change their ‘accents’ over time

Yellow-naped amazons in Costa Rica have regional accents, which have shifted over time. Charles J. Sharp The place you live can shape how you speak in many ways, from the words you use—whether you call it “soda” or “pop,” for example—to how you pronounce them. But we humans aren’t the only animals with distinct dialects; birds are known for their impressive array of “accents.” The mating song of a male mountain chickadee changes with elevation, for example. New research has found that the dialects of yellow-naped amazons—large, colorful parrots that live in Mexico and Central America—have shifted over time. When scientists surveyed yellow-naped amazons in Costa Rica back in 1994, they identified three distinct types of contact calls that the parrots use to keep in touch with one another and share information: North, South, and Nicaraguan. Each unique call, differing in complexity and melodic structure, was used in a particular area. The team found similar results in 2005, but a third survey in 2016 revealed a changed cultural soundscape. The boundary between the North and South dialects had shifted, and there were more “bilingual” birds using both dialects. New call variants had also sprung up in areas that had previously only used the South dialect. This shift may have something to do with the fact that, between 2005 and 2016, deforestation and climate change caused the population of yellow-naped amazons to sharply decline—with the species eventually uplisted to critically endangered status on the IUCN Red List. Changes in the parrots’ dialect, the researchers say, may reflect an adaptation to their changing circumstances.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2024.0659>

SCIENCEADVISER – An ocean apart

Scientists have discovered matching sets of dinosaur footprints in South America and Africa, neatly demonstrating how close these two continents—now on opposite sides of the Atlantic Ocean—were before they split.

<https://www.iflscience.com/dinosaur-tracks-on-two-separate-continents-reveal-seismic-split-140-million-years-ago-75694>

SCIENCEADVISER – Mo’ brain, mo’ problems

Human brains are big compared to other apes—a size difference believed to underlie our ability to trounce them in cognitive competitions. But in addition to being metabolically expensive to produce and maintain, all that extra tissue comes with another downside, new research suggests. While we may be smarter, we’re also more vulnerable to age-related neurodegeneration.

“There’s no free lunch,” neuroscientist and co-author Sam Vickery told The New York Times. Why these expanded regions are more vulnerable remains a mystery. As evolutionary biologist Caleb Finch noted to the outlet, “the neurons don’t have any chemical differences.”

<https://www.science.org/doi/10.1126/sciadv.ado2733>

SCIENCEADVISER – Very good dogs really do understand those talking buttons

Spend any time on TikTok, and you’ve probably seen one of those videos of dogs “talking” by pawing at buttons. Most of the time, they seem a little too good to be true: A pooch stomps on “want,” “help,” and “toy,” then walks over to a closet containing their favorite frisbee, for instance—or presses on a curse word after repeated pawing of “treat” is ignored. But new research suggests that button-trained dogs do understand at least some of the words they press.

Researchers conducted two studies—one where they went into dogs’ homes to test them, and one where they had dog owners test their pets themselves. In both, they recorded the animals’ reactions to words when spoken by people or when people pressed buttons. Regardless of whether it was an owner or a stranger talking or pressing, the animals frequently reacted appropriately—going to the door, for instance, at the word “outside.”

Does that mean that Waffles the Yorkie actually meant it when she called her owner an a-hole? A follow-up study may be required.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0307189&et rid=17774313&et cid=5336997>

SCIENCEADVISER – AIs can be covertly racist, not just overtly so

“Every single person working on generative AI needs to understand this paper,” one expert told Science’s Cathleen O’Grady. I can just hear ChatGPT now—“I’m not a racist language model, but...”

<https://www.science.org/content/article/ai-makes-racist-decisions-based-dialect>

SCIENCEADVISER – A monkey by any other name

Humans may be pretty skilled communicators, but we're far from the only chatty members of the animal kingdom. Multiple studies have demonstrated that marmosets—pint-sized primates that inhabit the rainforests of South America—learn to “talk” as infants by mimicking their parents, take turns while communicating, and even eavesdrop on their neighbors' conversations.

Now, new research has revealed that these miniscule monkeys also “name” each other—a behavior that, until now, had only been observed in a few species and no other nonhuman primates. After recording natural conversations between pairs of marmosets and observing the monkeys' behavior when those recordings were played back to them, scientists discovered that the animals use distinct vocalizations known as “phee-calls” to address and communicate with specific individuals. A given monkey could tell when a call was directed at them, for example, and responded appropriately.

<https://www.science.org/doi/10.1126/science.adp3757>

SCIENCE DAILY – Researcher finds sound progress in babies' speech development

The sounds babies make in their first year of life may be less random and more self-driven than previously believed, according to new research.

<https://www.sciencedaily.com/releases/2024/08/240823153453.htm>

SCIENCE DAILY – People seen as wise share these characteristics

What makes someone seem wise? People view wisdom through the lens of applying knowledge and thinking logically as well as considering others' feelings and perceptions, according to researchers who looked at perceptions of wisdom across 12 countries and five continents.

<https://www.sciencedaily.com/releases/2024/08/240823120050.htm>

SCIENCE DAILY – Bonobos and ancient origin of the 'common enemy effect'

A link between outgroup threats and ingroup cohesion has been considered since the time of Darwin to be an adaptation for group-based competition. During the years since, studies of all sorts -- from chimpanzees to cichlid fish to mongooses -- have found evidence supporting this view, but a crucial question has remained unanswered: what about species without strong inter-group competition?

<https://www.sciencedaily.com/releases/2024/08/240823120106.htm>

SCIENCE DAILY – Colorful traits in primates ease tensions between groups

Primate ornamentation plays a crucial role in communication not only within social groups but also between them, according to a new study. The research reveals that the males of species with overlapping home ranges often display vibrant colors or elaborate features, traits that may help reduce intergroup aggression by enabling quick assessments of potential rivals.

<https://www.sciencedaily.com/releases/2024/08/240822222612.htm>

SCIENCE DAILY – To kill mammoths in the Ice Age, people used planted pikes, not throwing spears

Archeologists say new findings might help resolve the debate about Clovis points and reshape how we think about what life was like roughly 13,000 years ago. After an extensive review of writings and artwork -- and an experiment with replica Clovis point spears -- a team of archaeologists says humans may have braced the butt of their weapons against the ground in a way that would impale a charging animal. The force would have driven the spear deeper into the predator's body, unleashing a more damaging blow than even the strongest prehistoric hunters would have been capable of by throwing or jabbing megafauna.

<https://www.sciencedaily.com/releases/2024/08/240821145927.htm>

SCIENCE DAILY – Humpbacks are among animals who manufacture and wield tools

Researchers suggest a new designation of the humpback whales they study: tool wielders. Researchers have known that humpback whales create “bubble-nets” to hunt, but they have learned that the animals don't just create the bubble-nets; they manipulate this unique tool in a variety of ways to maximize their food intake in Alaskan feeding grounds.

<https://www.sciencedaily.com/releases/2024/08/240820221814.htm>

SCIENCE DAILY – Autistic traits & behavior in 7-year-olds linked with gender nonconforming play

Gender nonconformity in 7-year-olds -- as measured by levels of gender-conforming play -- may be associated with autistic traits and behavioral difficulties in girls, and with peer relationship problems in boys, according to a new study.

<https://www.sciencedaily.com/releases/2024/08/240828154952.htm>

SCIENCE DAILY – Dogs understand words from soundboard buttons

A new study reveals that dogs trained with soundboard buttons can indeed comprehend specific words, producing contextually appropriate responses.

<https://www.sciencedaily.com/releases/2024/08/240828154926.htm>

SCIENCE DAILY – Non-cognitive skills: The hidden key to academic success

A study has revealed that non-cognitive skills, such as motivation and self-regulation, are as important as intelligence in determining academic success. These skills become increasingly influential throughout a child's education, with genetic factors playing a significant role. The findings suggest that fostering non-cognitive skills alongside cognitive abilities could significantly improve educational outcomes.

<https://www.sciencedaily.com/releases/2024/08/240826131236.htm>

SCIENCE DAILY – Researchers identify basic approaches for how people recognize words

Recognizing spoken words is a split-second competition, and a new study defines how people approach that competition and ultimately recognize words. The researchers identified three main approaches by which people of all ages -- including those who use cochlear implants to hear -- recognize spoken language.

<https://www.sciencedaily.com/releases/2024/08/240829132443.htm>

SCIENCE DAILY – How hope beats mindfulness when times are tough

A recent study finds that hope appears to be more beneficial than mindfulness at helping people manage stress and stay professionally engaged during periods of prolonged stress at work. The study underscores the importance of looking ahead, rather than living 'in the moment,' during hard times.

<https://www.sciencedaily.com/releases/2024/08/240830164155.htm>

SCIENCE DAILY – What a submerged ancient bridge in a Spanish cave reveals about early humans

Geologists examined a submerged 25-foot bridge to tackle a long-lasting archaeological controversy: When humans settled on the islands in the western Mediterranean. Their findings narrow a historical gap between the settlement timelines of the eastern and western Mediterranean regions.

<https://www.sciencedaily.com/releases/2024/08/240830110919.htm>

SCIENCE.ORG NEWS – Builders of massive ancient monument understood the science behind their work

Researchers say 6000-year-old Iberian Peninsula megalith required sophisticated knowledge of physics, geometry, and geology.

<https://www.science.org/content/article/builders-massive-ancient-monument-understood-science-behind-their-work>

SCIENCE.ORG NEWS – AI makes racist decisions based on dialect

Large language models strongly associated negative stereotypes with African American English.

<https://www.science.org/content/article/ai-makes-racist-decisions-based-dialect>

SCIENCE.ORG NEWS – Builders of massive ancient monument understood the science behind their work

Researchers say 6000-year-old Iberian Peninsula megalith required sophisticated knowledge of physics, geometry, and geology.

<https://www.science.org/content/article/builders-massive-ancient-monument-understood-science-behind-their-work>

PUBLICATIONS

Anthropological Review

PAPERS

GARY CLARK et al with ROBERT BEDNARIK & MACIEJ HENNEBERG – Hominin musical sound production: palaeoecological contexts and self domestication

In this article we seek to integrate theories of music origins and dance with hominin fossil anatomy and the paleoecological contexts of hominin evolution. Based on the association between rhythm in music, dance and locomotion, we propose that early bipedal hominins may have evolved neurobiological substrates different from other great apes due to the rhythmic aspects of bipedal walking and running. Combined with the emancipation of the hands resulting from erect posture, we propose that the neurobiological changes necessary for technological innovation, cultural practices and human musical abilities may have evolved, at least in incipient form, much earlier than previously thought. The consequent ability to synchronize movement and sound production may have also proved beneficial as early bipedal hominins ventured out of late Miocene and early Pliocene woodland and forested habitats and into more open habitats with increased predation risk. We

also postulate that, along with bipedalism, paedomorphic morphogenesis of the skull at the base of the hominin clade was a necessary prerequisite for the evolution of vocal modulation and singing in later varieties of hominin. To date research into the evolution of music and dance has yet to be integrated with the fossil and paleoecological evidence of early hominin evolution. This paper seeks to fill this lacuna in the extant literature on human evolution. We also suggest that autocatalytic feedback loops evolving synergistically with hominin erect posture, skull and hand morphology, neurochemical processes and the self-domestication syndrome, have been operative from early hominins some 6 Ma to the present. We document this process by reference to primatological, ethnographic, neurochemical and archaeological data.

<https://czasopisma.uni.lodz.pl/ar/article/view/19439>

Current Biology

CORRECTIONS

MANON K. SCHWEINFURTH et al with JOSEP CALL – Inter-Individual coordination in walking chimpanzees

ORIGINAL PAPER: *Current Biology* 32, 5138–5143.e1–e3; December 5, 2022, *EAORC Bulletin* 1,010.

We have identified an error in the phase relationship equation published in the original version of the paper. The equation was incorrectly printed as:

$$(t) = ((DA(t1) - DB(t1)) / (DA(t1-t0) - DB(t1-t0)) / 2) \times 360^\circ$$

The correct equation, consistent with the analyses and the phase relationship literature, should be:

$$(t) = ((DA(t1) - DB(t1)) / (DA(t1-t0) + DB(t1-t0)) / 2) \times 360^\circ$$

Please note that this error does not affect the analyses or conclusions presented in the paper. We apologize for the error and the confusion it may have caused.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(24\)01154-0](https://www.cell.com/current-biology/fulltext/S0960-9822(24)01154-0)

eLife

PAPERS

MARTIN BREYTON et al with MARCELLO MASSIMINI – Spatiotemporal brain complexity quantifies consciousness outside of perturbation paradigms

Signatures of consciousness are found in spectral and temporal properties of neuronal activity. Among these, spatiotemporal complexity after a perturbation has recently emerged as a robust metric to infer levels of consciousness. Perturbation paradigms remain, however, difficult to perform routinely. To discover alternative paradigms and metrics we systematically explore brain stimulation and resting-state activity in a digital brain twin model. We find that perturbational complexity only occurs when the brain model operates within a specific dynamical regime, in which spontaneous activity produces a large degree of functional network reorganizations referred to as being fluid. The regime of high brain fluidity is characterized by a small battery of metrics drawn from dynamical systems theory and predicts the impact of consciousness altering drugs (Xenon, Propofol and Ketamine). We validate the predictions in a cohort of 15 subjects at various stages of consciousness and demonstrate their agreement with previously reported perturbational complexity, but in a more accessible paradigm. Beyond the facilitation in clinical use, the metrics highlights complexity properties of brain dynamics in support of emergence of consciousness.

<https://elifesciences.org/reviewed-preprints/98920>

Evolutionary Human Sciences

PAPERS

BING DONG, SILVIA PARACCHINI & ANDY GARDNER – Kin selection as a modulator of human handedness: sex-specific, parental and parent-of-origin effects

The frequency of left-handedness in humans is ~10% worldwide and slightly higher in males than females. Twin and family studies estimate the heritability of human handedness at around 25%. The low but substantial frequency of left-handedness has been suggested to imply negative frequency-dependent selection, e.g. owing to a “surprise” advantage of left-handers in combat against opponents more used to fighting right-handers. Because such game-theoretic hypotheses involve social interaction, here, we perform an analysis of the evolution of handedness based on kin-selection, which is understood to play a major role in the evolution of social behaviour generally. We show that: (1) relatedness modulates the balance of right-handedness versus left-handedness, according to whether left-handedness is marginally selfish versus marginally altruistic; (2) sex differences in relatedness to social partners may drive sex differences in handedness; (3) differential relatedness of parents and offspring may generate parent-offspring conflict and sexual conflict leading to the evolution of maternal and paternal genetic effects in relation to handedness; and (4) differential relatedness of maternal-origin versus paternal-origin genes may generate intragenomic conflict leading to the evolution of parent-of-origin-specific gene effects—such as “genomic imprinting”—and associated maladaptation.

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/kin-selection-as-a-modulator-of-human-handedness-sexspecific-parental-and-parentoforigin-effects/1DCC806495C262319A45B091B0EF94F7>

Frontiers in Language Sciences
PAPERS**NOELLE ABBOTT, IGNATIUS NIP & TRACY LOVE – Rate of speech affects the comprehension of pronouns in children with developmental language disorder**

This study examined whether children with Developmental Language Disorder (DLD) have knowledge of binding principles (i.e., linking pronouns to their structurally licensed antecedent) during real-time sentence processing (cross-modal priming, real-time) and overt comprehension (sentence-picture matching, interpretative) and whether rate of speech impacted access to that knowledge. Fourteen children with DLD participated in two experiments, with sentences presented auditorily at either a regular or slow speech rate. Sentences were matched except to contain a pronoun, reflexive, or noun phrase (control) in the same syntactic position. Experiment (1) used a cross-modal picture priming paradigm to test real-time pronoun-antecedent linking abilities at both rates of speech. Children were instructed to make a binary decision during the uninterrupted auditory presentation of a sentence to a visually presented image (of the antecedent) at the offset of a pronoun, a reflexive, or a control noun. Response times between conditions (e.g., pronoun vs. control noun) were compared to determine whether participants showed evidence of facilitative priming (faster response times in the pronoun than control noun condition) at either speech rate. Experiment (2) used an auditory sentence-picture-matching task to test final comprehension of similar sentences containing a pronoun or reflexive. Accuracy was compared across both speech rates. For Experiment (1), children with DLD did not show evidence of real-time pronoun-antecedent priming at the regular speech rate. However, when sentences were slowed, they showed facilitative priming for the pronoun condition. For experiment (2), children with DLD performed at-chance when interpreting sentences with pronouns regardless of speech rate. While children with DLD have been shown to have difficulty processing sentences containing anaphors (such as pronouns), results suggest that this is not due to loss of intrinsic knowledge of binding principles. By slowing the rate of speech input, we showed that children with DLD do have access to that knowledge and can make the correct link during real-time processing between a pronoun and its structurally licensed antecedent (Experiment 1) but need more time to do so. However, the effect of slowed speech input does not extend to final comprehension (Experiment 2).

<https://www.frontiersin.org/journals/language-sciences/articles/10.3389/flang.2024.1394742/full>

Heliyon**PAPERS****LINGQI KONG et al – The influence of form on motion signal processing in the ventral intraparietal area of macaque monkeys**

The visual system relies on both motion and form signals to perceive the direction of self-motion, yet the coordination mechanisms between these two elements in this process remain elusive. In the current study, we employed heading perception as a model to delve into the interaction characteristics between form and motion signals. We recorded the responses of neurons in the ventral intraparietal area (VIP), an area with strong heading selectivity, to motion-only, form-only, and combined stimuli of simulated self-motion. Intriguingly, VIP neurons responded to form-only cues defined by Glass patterns, although they exhibited no tuning selectivity. In combined condition, introducing a small offset between form and motion cues significantly enhanced neuronal sensitivity to motion cues. However, with a larger offset, the enhancement effect on sensitivity became comparatively smaller. Moreover, we observed that the influence of form cues on neuronal response to motion cues is more pronounced in the later stage (1–2 s) of stimulation, with a relatively smaller effect in the early stage (0–1 s). This suggests a dynamic interaction between motion and form cues over time for heading perception. In summary, our study uncovered that in area VIP, form information plays a role in constructing accurate self-motion perception. This adds valuable insights into the complex dynamics of how the brain integrates motion and form cues for the perception of one's own movements.

[https://www.cell.com/heliyon/fulltext/S2405-8440\(24\)12944-1](https://www.cell.com/heliyon/fulltext/S2405-8440(24)12944-1)

Journal of the Royal Anthropological Institute**PAPERS****ZE HONG – The cognitive origin and cultural evolution of taboos in human societies**

Why do human societies have so many taboos, defined here as culturally prohibited activities? In this article, I offer a naturalistic account of the origin and transmission of taboos from an evolutionary anthropological perspective. Drawing from the extensive literature in cognitive science and cultural evolution, I argue that taboos may arise from our tendency to retrospectively attribute causes to misfortunes due to a deterministic worldview, and the imperfect transmission of taboos often leads to the loss of their original utilitarian rationale, making them resemble mere cultural conventions. While this account does not explain all cultural prohibitions in human societies, it provides valuable insights into the psychological and social mechanisms by which many taboos are generated in a bottom-up fashion. Towards the end of the article, I offer a few implications on the proposed account of taboos and specify some testable predictions that merit further studies.

<https://rai.onlinelibrary.wiley.com/doi/full/10.1111/1467-9655.14098>

Nature**PAPERS****VALENTIN HOFMANN et al – AI generates covertly racist decisions about people based on their dialect**

Hundreds of millions of people now interact with language models, with uses ranging from help with writing to informing hiring decisions. However, these language models are known to perpetuate systematic racial prejudices, making their judgements biased in problematic ways about groups such as African Americans. Although previous research has focused on overt racism in language models, social scientists have argued that racism with a more subtle character has developed over time, particularly in the United States after the civil rights movement. It is unknown whether this covert racism manifests in language models. Here, we demonstrate that language models embody covert racism in the form of dialect prejudice, exhibiting raciolinguistic stereotypes about speakers of African American English (AAE) that are more negative than any human stereotypes about African Americans ever experimentally recorded. By contrast, the language models' overt stereotypes about African Americans are more positive. Dialect prejudice has the potential for harmful consequences: language models are more likely to suggest that speakers of AAE be assigned less-prestigious jobs, be convicted of crimes and be sentenced to death. Finally, we show that current practices of alleviating racial bias in language models, such as human preference alignment, exacerbate the discrepancy between covert and overt stereotypes, by superficially obscuring the racism that language models maintain on a deeper level. Our findings have far-reaching implications for the fair and safe use of language technology.

<https://www.nature.com/articles/s41586-024-07856-5>

Nature Communications**PAPERS****TOBIAS J. WIECZOREK et al – A framework for the emergence and analysis of language in social learning agents**

Neural systems have evolved not only to solve environmental challenges through internal representations but also, under social constraints, to communicate these to conspecifics. In this work, we aim to understand the structure of these internal representations and how they may be optimized to transmit pertinent information from one individual to another. Thus, we build on previous teacher-student communication protocols to analyze the formation of individual and shared abstractions and their impact on task performance. We use reinforcement learning in grid-world mazes where a teacher network passes a message to a student to improve task performance. This framework allows us to relate environmental variables with individual and shared representations. We compress high-dimensional task information within a low-dimensional representational space to mimic natural language features. In coherence with previous results, we find that providing teacher information to the student leads to a higher task completion rate and an ability to generalize tasks it has not seen before. Further, optimizing message content to maximize student reward improves information encoding, suggesting that an accurate representation in the space of messages requires bi-directional input. These results highlight the role of language as a common representation among agents and its implications on generalization capabilities.

<https://www.nature.com/articles/s41467-024-51887-5>

GWENNA BRETON et al – BaTwa populations from Zambia retain ancestry of past hunter-gatherer groups

Sub-equatorial Africa is today inhabited predominantly by Bantu-speaking groups of Western African descent who brought agriculture to the Luangwa valley in eastern Zambia ~2000 years ago. Before their arrival the area was inhabited by hunter-gatherers, who in many cases were subsequently replaced, displaced or assimilated. In Zambia, we know little about the genetic affinities of these hunter-gatherers. We examine ancestry of two isolated communities in Zambia, known as BaTwa and possible descendants of recent hunter-gatherers. We genotype over two million genome-wide SNPs from two BaTwa populations (total of 80 individuals) and from three comparative farming populations to: (i) determine if the BaTwa carry genetic links to past hunter-gatherer-groups, and (ii) characterise the genetic affinities of past Zambian hunter-gatherer-groups. The BaTwa populations do harbour a hunter-gatherer-like genetic ancestry and Western African ancestry. The hunter-gatherer component is a unique local signature, intermediate between current-day Khoe-San ancestry from southern Africa and central African rainforest hunter-gatherer ancestry.

<https://www.nature.com/articles/s41467-024-50733-y>

JOSEPH SIMON IV & ERIN L. RICH – Neural populations in macaque anterior cingulate cortex encode social image identities

The anterior cingulate cortex gyrus (ACCg) has been implicated in prosocial behaviors and reasoning about social cues. While this indicates that ACCg is involved in social behavior, it remains unclear whether ACCg neurons also encode social information during goal-directed actions without social consequences. To address this, we assessed how social information is processed by ACCg neurons in a reward localization task. Here we show that neurons in the ACCg of female rhesus monkeys differentiate the identities of conspecifics in task images, even when identity was task-irrelevant. This was in contrast to the prearcuate cortex (PAC), which has not been strongly linked to social behavior, where neurons differentiated identities in both social and nonsocial images. Many neurons in the ACCg also categorically distinguished social from nonsocial trials, but this encoding was only slightly more common in ACCg compared to the PAC. Together, our results suggest that ACCg neurons

are uniquely sensitive to social information that differentiates individuals, which may underlie its role in complex social reasoning.

<https://www.nature.com/articles/s41467-024-51825-5>

YAPING SHAO et al – Reconstruction of human dispersal during Aurignacian on pan-European scale

The Aurignacian is the first techno-complex related with certainty to Anatomically Modern Humans in Europe. Studies show that they appeared around 43-42 kyr cal BP and dispersed rapidly in Europe during the Upper Palaeolithic. However, human dispersal is a highly convoluted process which is until today not well understood. Here, we provide a reconstruction of the human dispersal during the Aurignacian on the pan-European scale using a human dispersal model, the Our Way Model, which combines archaeological with paleoclimate data and uses the human existence potential as a unifying driver of human population dynamics. Based on the reconstruction, we identify the different stages of the human dispersal and analyse how human demographic processes are influenced by climate change and topography. A chronology of the Aurignacian human groups in Europe is provided, which is verified for locations where archaeological dating records are available. Insights into highly debated hypotheses, such as human dispersal routes, are provided.

<https://www.nature.com/articles/s41467-024-51349-y>

Nature Ecology & Evolution

ARTICLES

W. ANDREW BARR – Spatial bias in the fossil record affects understanding of human evolution

Using modern mammals as analogues, we investigate how spatial bias in the early human fossil record probably influences understanding of human evolution. Our results suggest that the environmental and fossil records from palaeoanthropological hotspots are probably missing aspects of environmental and anatomical variation.

<https://www.nature.com/articles/s41559-024-02524-3>

New Scientist

NEWS

Neolithic engineers used science knowledge to build megalith monument

A monument in southern Spain that dates to between 3600 and 3800 BC appears to have been built with an understanding of geology and physics.

<https://www.newscientist.com/article/2445182-neolithic-engineers-used-science-knowledge-to-build-megalith-monument/>

REVIEWS

SIMON INGS – A gripping account of morality shows how we work out right from wrong

Where do morals come from? In *Animals, Robots, Gods*, anthropologist Webb Keane argues imagination and differing senses of the world are key to discerning right from wrong.

Review of 'Animals, Robots, Gods' by Webb Keane, Allen Lane (Penguin), 2024.

<https://www.newscientist.com/article/mg26335060-400-a-gripping-account-of-morality-shows-how-we-work-out-right-from-wrong/>

PLoS One

PAPERS

AMALIA P. M. BASTOS et al – How do soundboard-trained dogs respond to human button presses? An investigation into word comprehension

Past research on interspecies communication has shown that animals can be trained to use Augmentative Interspecies Communication (AIC) devices, such as soundboards, to make simple requests of their caretakers. The recent uptake in AIC devices by hundreds of pet owners around the world offers a novel opportunity to investigate whether AIC is possible with owner-trained family dogs. To answer this question, we carried out two studies to test pet dogs' ability to recognise and respond appropriately to food-related, play-related, and outside-related words on their soundboards. One study was conducted by researchers, and the other by citizen scientists who followed the same procedure. Further, we investigated whether these behaviours depended on the identity of the person presenting the word (unfamiliar person or dog's owner) and the mode of its presentation (spoken or produced by a pressed button). We find that dogs produced contextually appropriate behaviours for both play-related and outside-related words regardless of the identity of the person producing them and the mode in which they were produced. Therefore, pet dogs can be successfully taught by their owners to associate words recorded onto soundboard buttons to their outcomes in the real world, and they respond appropriately to these words even when they are presented in the absence of any other cues, such as the owner's body language.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0307189>

DEVARA ANIL et al – Deep-rooted Indian Middle Palaeolithic: Terminal Middle Pleistocene lithic assemblage from Retlapalle, Andhra Pradesh, India

The Indian Middle Palaeolithic has been recognized as crucial evidence for understanding the complex behavioural dynamics of hominins and is also seen as a behavioural marker of early *Homo sapiens* in the region. Recent research has pushed back the timeline of the Middle Palaeolithic to the Middle Pleistocene epoch, indicating a potential in-situ emergence from the earlier Late Acheulian culture. The long-lasting Middle Palaeolithic culture in India evolve over multiple glacial-interglacial cycle, showing signs of behavioural resilience to bigger climatic upheaval like ~74 ka Toba super-eruption. This has added to the complexity of our understanding of the Middle Palaeolithic in the region and emphasizes the need for further research. This study focuses upon the investigation of Middle Palaeolithic artefacts found in the Retlapalle area within the upper Gundlakamma river basin, Andhra Pradesh. The dating of the artefact-bearing layer was carried out using the p-IR-IRSL method, which revealed a burial age of 139±17 thousand years. The Retlapalle assemblage is characterized by a diverse range of Levallois core reductions, various retouched artefacts, with a dominance of pointed tools, and a few blade components. The study provides a valuable addition to the existing body of data concerning Palaeolithic sites dating back to the Middle Pleistocene, a period that remains relatively underexplored.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0302580>

JAVIER SÁNCHEZ-MARTÍNEZ et al – Virtual reconstruction of stone tool refittings by using 3D modelling and the Blender Engine: The application of the “ReViBE” protocol to the archaeological record

Visual representation of material culture plays a crucial role in prehistoric archaeology, from academic research to public outreach and communication. Scientific illustration is a valuable tool for visualising lithic artefacts and refittings, where technical attributes must be drawn to enhance our understanding of their significance. However, the representation of lithic refittings, which involve dynamic and sequential transformations of a volume, requires an alternative approach to traditional two-dimensional models such as photography or illustration. Advances in imaging technologies have improved our ability to capture and communicate the multifaceted nature of archaeological artefacts. In this context, we present the ReViBE protocol (Refitting Visualisation using Blender Engine), which integrates photogrammetry, 3D modelling and the animation software Blender© for the virtual representation of lithic refittings. This protocol allows the sequential study of core reduction phases and their associated flakes, as well as other aspects related to knapping decision making (core rotations, surface modifications, and direction and position of impact points). Thus, this method allows the visualisation of techno-cognitive aspects involved in core reduction through a step-by-step animation process. In addition, the 3D models and virtual reconstructions generated by ReViBE can be accessed through open repositories, in line with the principles of open science and FAIR (Findable, Accessible, Interoperable, and Reusable) data. This accessibility ensures that data on lithic technology and human behaviour are widely available, promoting transparency and knowledge sharing, and enabling remote lithic analysis. This in turn breaks down geographical barriers and encourages scientific collaboration.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0309611>

PNAS**PAPERS****GUANGRONG WANG et al – Confusion cannot explain cooperative behavior in public goods games**

Some scholars find that behavioral variation in the public goods game is explained by variations in participants' understanding of how to maximize payoff and that confusion leads to cooperation. Their findings lead them to question the common assumption in behavioral economics experiments that choices reflect motivations. We conduct two experiments, in which we minimize confusion by providing participants with increased training. We also introduce a question that specifically assesses participants' understanding of payoff maximization choices. Our experimental results show that the distribution of behavior types is significantly different when participants play with computers versus humans. A significant increase in contributions is also observed when participants play with humans compared to when they play with computers. Moreover, social norms may be the main motive for contributions when playing with computers. Our findings suggest that social preferences, rather than confusion, play a crucial role in determining contributions in public goods games when playing with humans. We therefore argue that the assumption in behavioral economics experiments that choices reveal motivations is indeed valid.

<https://www.pnas.org/doi/10.1073/pnas.2310109121>

COMMENTARIES**TOKE R. FOSGAARD & ERIK WENGSTRÖM – Insufficient evidence to conclude that confusion cannot explain cooperative behavior**

We read with interest the paper by Wang et al. (2024) on confusion in public goods games. Their conclusion—that confusion is not a significant factor in explaining cooperation—challenges much of the existing literature. However, we believe that their study overlooks crucial aspects of confusion measurement and lacks critical design elements.

<https://www.pnas.org/doi/full/10.1073/pnas.2412216121>

GUANGRONG WANG et al – Reply to Fosgaard and Wengström: Confusion should not be used to explain cooperative behavior in public goods game experiments

Wang et al. introduce a novel design to distinguish confusion (i.e., misunderstanding the game) from the factors influencing cooperation decisions and suggest that social preferences, rather than confusion, play a crucial role in determining cooperation in public goods games (hereinafter “PGG”). Fosgaard and Wengström question this conclusion. However, their comments result from a misunderstanding of the experimental design of Wang et al.

<https://www.pnas.org/doi/full/10.1073/pnas.2413208121>

Proceedings of the Royal Society B**PAPERS****JOSEPH V. HACKMAN et al – Adipose development is consistent across hunter–gatherers and diverges from western references**

Despite agreement that humans have evolved to be unusually fat primates, adipose patterning among hunter–gatherers has received little empirical consideration. Here we consider the development of adiposity among four contemporary groups of hunter–gatherers, the Aka, Savanna Pumé, Ju’/Hoansi and Agta using multi-level generalized additive mixed modelling to characterize the growth of tricep skinfolds from early childhood through adolescence. In contrast to references, hunter–gatherers show several consistent patterns: (i) children are lean with little fat accumulation; (ii) no adiposity rebound at 5 years is evident; (iii) girls on average have built 90% of their body size, and reach menarche when adiposity is at its maximum velocity; and (iv) a metabolic trade-off is evident in young, but not older children, such that both boys and girls prioritize skeletal growth during middle childhood, a trade-off that diminishes during adolescence when height velocity increases in pace with fat accumulation. Consistent results across hunter–gatherers living in diverse environments suggest that these patterns reflect a general forager pattern of development. The findings provide a valuable baseline for adipose development not apparent from reference populations. We emphasize both generalized trends among hunter–gatherers, and that inter-population differences point to the plasticity with which humans organize growth and development.

<https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2024.0110>

ANA ARZELIER et al – Ancient DNA sheds light on the funerary practices of late Neolithic collective burial in southern France

The Aven de la Boucle (Corconne, Gard, southern France) is a karst shaft used as a collective burial between 3600 and 2800 cal BCE. The site encompasses the skeletal remains of approximately 75 individuals comprising a large majority of adult individuals, represented by scattered and commingled remains. To date, few studies have explored the potential of ancient DNA to tackle the documentation of Neolithic collective burials, and the funerary selection rules within such structures remain largely debated. In this study, we combine genomic analysis of 37 individuals with archaeo-anthropological data and Bayesian modelling of radiocarbon dates. Through this multidisciplinary approach, we aim to characterize the identity of the deceased and their relationships, as well as untangle the genetic diversity and funerary dynamics of this community. Genomic results identify 76% of male Neolithic individuals, suggesting a marked sex-biased selection. Available data emphasize the importance of biological relatedness and a male-mediated transmission of social status, as the affiliation to a specific male-lineage appears as a preponderant selection factor. The genomic results argue in favour of ‘continuous’ deposits between 3600 and 2800 BCE, carried out by the same community, despite cultural changes reflected by the ceramic material.

<https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2024.1215>

Science**ARTICLES****HANNAH RICHTER – Builders of massive ancient monument understood the science behind their work**

Researchers say 6000-year-old Iberian Peninsula megalith required sophisticated knowledge of physics, geometry, and geology.

<https://www.science.org/content/article/builders-massive-ancient-monument-understood-science-behind-their-work>

PAPERS**GUY OREN et al – Vocal labeling of others by nonhuman primates**

Humans, dolphins, and elephants are the only known species that vocally label their conspecifics. It remains unclear whether nonhuman primates share this ability. We recorded spontaneous “phee-call” dialogues between pairs of marmoset monkeys. We discovered that marmosets use these calls to vocally label their conspecifics. Moreover, they respond more consistently and correctly to calls that are specifically directed at them. Analysis of calls from multiple monkeys revealed that family members use similar calls and acoustic features to label others and perform vocal learning. These findings shed light on the complexities of social vocalizations among nonhuman primates and suggest that marmoset vocalizations may provide a model for understanding aspects of human language, thereby offering new insights into the evolution of social communication.

<https://www.science.org/doi/10.1126/science.adp3757>

REVIEWS

GAIL PATRICELLI – Call of the wild

A zoologist probes the origins of complex communication in the animal world

Review of 'Why Animals Talk: The New Science of Animal Communication' by Arik Kershenbaum, Penguin, 2024.

<https://www.science.org/doi/10.1126/science.adq6655>

Science Advances

PAPERS

SAM VICKERY et al with WILLIAM D. HOPKINS & CHET C. SHERWOOD – The uniqueness of human vulnerability to brain aging in great ape evolution

Aging is associated with progressive gray matter loss in the brain. This spatially specific, morphological change over the life span in humans is also found in chimpanzees, and the comparison between these great ape species provides a unique evolutionary perspective on human brain aging. Here, we present a data-driven, comparative framework to explore the relationship between gray matter atrophy with age and recent cerebral expansion in the phylogeny of chimpanzees and humans. In humans, we show a positive relationship between cerebral aging and cortical expansion, whereas no such relationship was found in chimpanzees. This human-specific association between strong aging effects and large relative cortical expansion is particularly present in higher-order cognitive regions of the ventral prefrontal cortex and supports the "last-in-first-out" hypothesis for brain maturation in recent evolutionary development of human faculties.

<https://www.science.org/doi/10.1126/sciadv.ado2733>

Trends in Neurosciences

PAPERS

ANA P. PINHEIRO, JEAN-JULIEN AUCOUTURIER & SONJA A. KOTZ – Neural adaptation to changes in self-voice during puberty

The human voice is a potent social signal and a distinctive marker of individual identity. As individuals go through puberty, their voices undergo acoustic changes, setting them apart from others. In this article, we propose that hormonal fluctuations in conjunction with morphological vocal tract changes during puberty establish a sensitive developmental phase that affects the monitoring of the adolescent voice and, specifically, self–other distinction. Furthermore, the protracted maturation of brain regions responsible for voice processing, coupled with the dynamically evolving social environment of adolescents, likely disrupts a clear differentiation of the self-voice from others' voices. This socioneuroendocrine framework offers a holistic understanding of voice monitoring during adolescence.

[https://www.cell.com/trends/neurosciences/abstract/S0166-2236\(24\)00142-5](https://www.cell.com/trends/neurosciences/abstract/S0166-2236(24)00142-5)

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