EAORC BULLETIN 1,130 – 9 February 2025

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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.

NEW BOOK ALERT – Human Migration and Language Evolution

Editions of the Collège de France 2025

SALIKOKO S. MUFWENE – Human Migration and Language Evolution: The paths of Creoles and French

Far from being immutable, languages are constantly being changed by contact between people. Human migration is therefore an important factor in linguistic evolution. The migrations between European countries their colonies, from the fifteenth century onward, have given rise to new varieties and, in particular, to Creoles. The history of the dialects that appeared during the modern period deserves examination, as their processes of emergence and differentiation echo those of the Romance languages.

This inaugural lecture analyzes the evolutionary dynamics of Creoles and French, highlighting the social, political and economic issues that run through them. Questioning the prejudices of nineteenth-century philologists and the preconceived ideas that persist today shows that deconstruction of colonial representations of Creole formation informs our understanding of how Romance languages developed.

Salikoko S. Mufwene is a Professor of Linguistics at the University of Chicago, where he holds the Edward Carson Waller Distinguished Service chair. His research focuses on linguistic evolution, including the emergence of Creole dialects, the indigenization of European colonial languages, and the vitality of languages. He also holds the 2023-24 Chair of Francophone Worlds, created in partnership with the Agence universitaire de la Francophonie.

FROM THE PROLOGUE

In this inaugural lecture, I return to some of my hypotheses concerning the emergence of Creoles in order to highlight what we still do not know about the emergence of French and, by extension, that of the Romance languages. Through this approach, I want to show that, contrary to certain preconceived ideas, current research on the progressive emergence of creoles suggests new avenues of research to better explain the previous evolution of the languages from which they developed. I will focus on the emergence of French from the Latin diffused and restructured in Gaul, a province of the Western Roman Empire. I will also discuss the evolution of this new language from the end of the Middle Ages, which follows the decline of the Empire by several centuries. To help you understand the comparison I make, I will treat the formation of empires as a form of colonization. To understand the differential evolution of languages, I must start by distinguishing between colonization, settlement and exploitation.

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Language: French
Number of pages: 80
Price: €12.00
Distribution: FMSH-Diffusion
Format: Print
https://www.college-de-france.fr/fr/editions/lecons-inaugurales/migrations-humaines-et-evolution-linguistique-9782722608290

ACADEMIA.EDU – Contemporary problems in the evolution of language

Theoria et Historia Scientiarum, vol. IX (2012)

SŁAWOMIR WACEWICZ & PRZEMYSŁAW ŻYWICZYŃSKI – Beyond protolanguage: Contemporary problems in the evolution of language

The emergence of the uniquely human ability to acquire and use language has invariably been perceived as a problem that is both exceptionally difficult and intriguing. Conjectures regarding the sources of language have never been in short supply, substantiating some of the mistrust in the purposefulness of this type of study. The earliest manifestations of this mistrust – such as the famous 1866 "ban" on the inquiry into language origins, found in the statute of Société de Linguistique de Paris – have acquired a legendary status; but it is interesting to observe that as recently as thirty years ago it was fair for linguists to claim that the phylogeny of language was irrelevant to linguistic research, constituting a proprietary area of mythological, religious or philosophical reflection (e.g. Fisiak 1985).
https://www.academia.edu/116134895/Beyond_protolanguage_Contemporary_problems_in_the_evolution_of_language

ACADEMIA.EDU – Origin and Development of Human Cognition

Panamerican Journal of Neuropsychology 15:1, 186-198 (2021)

SARA RIVERA VELASCO & ÁNGEL RIVERA ARRIZABALAGA – Origin and Development of Human Cognition: Exaptation, Coevolution and Cognitive Emergence

The psychobiological mechanisms by which the genus Homo developed its cognitive abilities have focused on evolutionary genetics and the action of its particular social and cultural environment, but their concrete articulation is still far from being known. This study analyses how the culture of human niches takes on an especially important role in the cognitive development of human populations. The cultural and social mechanisms used to achieve the development of their cognitive capacities and even the beginning of new ones would be exaptation, co-evolution, and emergence. As an example of this evolutionary form, an analysis of causal cognition is proposed.
https://www.academia.edu/85260993/Origin_and_development_of_human_cognition_exaptation_coevolution_and_cognitive_emergence

ACADEMIA.EDU – When Did We Become Human?

In G. Hatfield & H. Pittman (eds.), Evolution of Mind, Brain, and Culture. University of Pennsylvania Museum Press. 45-89 (2007).

THEODORE G. SCHURR (2007). When Did We Become Human? Evolutionary Perspectives on the Emergence of the Modern Human Mind, Brain, and Culture

One of the most longstanding debates in the field of biological anthropology is when members of our lineage became "human." There is keen interest in knowing when we evolved the characteristics seen in our species, and which of these features truly makes us distinctive from other primates and especially earlier forms of hominins. Language, culture, tool use, brain size, and bipedalism have all been cited as traits that differentiate modern humans from other primate species. While it was once thought that these traits were uniquely human, we now understand most of them to be elaborations of similar features in other species, although with some specific manifestations for modern humans.
https://www.academia.edu/79754300/2_When_Did_We_Become_Human_Evolutionary_Perspectives_on_the_Emergence_of_the_Modern_Human_Mind_Brain_and_Culture

NEWS

JOHN TEMPLETON FOUNDATION – Let Children Play

Play has always mattered. Our art reveals it. The French writer François Rabelais, in his 1542 novel Gargantua, recounts more than 200 games that his fictional hero plays. Translating the work, German, English, and Dutch writers added hundreds more games. In his 16th century poetry, Mellin de Saint-Gelais wrote about ball games and jeu de prime, a popular card game. Pieter Bruegel's 1560 oil painting "Children's Games" depicts a village square where more than 200 children are playing more than 80 games. Yet over the last half-century, a confluence of forces has wrung free play out of childhood.
https://www.templeton.org/news/let-children-play

LSA NEWS – Obituary: William "Bill" Labov, 1979 LSA President

Bill Labov passed away on December 17, 2024, at 97 with his wife Gillian by his side. He will be remembered for generations to come as a trailblazing linguist, mentor to many, and beloved family member.
https://www.lsadc.org/content.asp?contentid=446&mc_cid=283b708ba0&mc_eid=5154d4385c

NATURE BRIEFING – 'Archaeology's closest thing to a household name'

Colin Renfrew, who helped to transform archaeology as a scientific discipline, died last November, aged 87. In the 1960s, researchers discovered that tree rings from bristlecone pines (Pinus longaeva) — which are among the oldest living things on Earth — could be used to redate artefacts in Europe. Prompted by these developments, Renfrew helped develop a fresh understanding of how European and Near Eastern civilizations developed, alongside new models for how societies change. "Renfrew's ideas were decades ahead of available computational modelling power," writes his colleague, archaeologist Cyprian Broodbank.
https://www.nature.com/articles/d41586-025-00220-1

NATURE BRIEFING – The origin of Indo-European languages

Ancient-genomics researchers have pinpointed the homelands of a nomadic tribe that transformed the culture and genetics of Europe and Asia, revealing a potential source for the Indo–European language family, spoken by nearly half of the world's population. Genomes from more than 400 individuals suggest that the Yamnaya — Bronze Age herders from the grassy plains of present-day Russia and Ukraine — emerged along the northern shores of the Black Sea. "This Indo–European story has been a mystery for 200 years, and now step by step, we are coming closer to the solution," says archaeologist Volker Heyd.
https://www.nature.com/articles/d41586-025-00382-y

NATURE BRIEFING – The discovery of the cradle of humankind

In 1925, Nature published a paper by anthropologist Raymond Dart describing a fossil he called Australopithecus africanus — today known as the Taung Child. The fossil, named after the South African town near where it was found, led to the understanding that humans and their ancestors evolved in Africa. "There was an element of disbelief, mixed in with a hefty dose of racism because they couldn't imagine that humans arose from Africa. That made many scientists dismissive," biological anthropologist Rebecca Rogers Ackermann writes in Nature Africa. A hundred years on, Nature Africa has produced a collection of articles about the discovery that revolutionized our understanding of evolution and launched African palaeoanthropology. A further collection of 100 papers take us on a journey from Dart's first manuscript to the latest discoveries from Africa, the cradle of humankind.
https://www.nature.com/articles/d41586-025-00282-1

SAPIENS – Were Twins the Norm in Our Primate Past?

New research uncovers how the last common primate ancestors typically birthed twins until evolutionary pressures began to favor singletons—likely driven by the advantages of birthing larger, brainier offspring.
https://www.sapiens.org/biology/twins-primates-human-evolution/

SCIAM NEWS – Bonobos Can Tell When a Human Doesn't Know Something

An experiment shows that bonobos can understand when a human lacks knowledge and point them in the right direction.
https://www.scientificamerican.com/article/bonobos-can-tell-when-a-human-doesnt-know-something/

SCIENCEADVISER – Mixing mythology with genetics, scientists trace the history of human storytelling

In recent years, scientists across multiple fields have investigated questions related to mythology and folklore. A narrative passed down in Hawaiian culture, for example, helped uncover evidence of a massive hurricane from hundreds of years ago. In another study, ancient DNA provided a link between child sacrifice and an ancient Maya creation story while also granting insight into modern genetic patterns.

Now, in a new bioRxiv preprint, researchers harness genetic data to explore the dispersal of common mythological motifs across cultures around the world. Their findings point to moments in history when people and their stories moved together and suggest that some myths may have already been a part of human culture when our species left Africa about 60,000 years ago.
https://www.biorxiv.org/content/10.1101/2025.01.24.634692v1.full

SCIENCEADVISER – Bonobos in the know

These apes can tell when they know something you don't—and are willing to point you in the right direction. In a new experiment, captive bonobos knew when a human companion was unaware of the location of a treat hidden and under a cup and eagerly guided them to the correct choice.
https://www.pnas.org/doi/full/10.1073/pnas.2412450122

SCIENCEADVISER – Whale song is structured like human language

Whales and babies might learn to communicate the same way, according to new research. In a Science paper out this week, scientists report that humpback whale songs have a similar structure to human language, making them easier to learn. Human babies use probability to discover the edges of words and identify individual words in a constant stream of language. So, scientists applied this same analytical method to 8 years' worth of whale song. They found that the structure aligns with a statistical pattern called Zipf's law, where frequency of words is inversely proportional to their rank: In human language there are many infrequent words like "catamaran" or "ravioli", and only a few high-frequency words like "the" or "a". For whale biologist Ellen Garland, "it was an incredibly surprising and striking result," she tells ScienceAdviser.

A similar paper published this week in Science Advances says that 11 species of dolphins and whales also follow an efficiency law, called Menzerath's law, where these animals produce shorter sound elements to communicate as efficiently as possible. Although it's been previously thought that research into whale communication could lead us to one day having a conversation with them, for some scientists, that's not the goal. Perhaps it lies in something more fundamental, says whale biologist Shane Gero who was not involved in either study, like understanding "what it's like to live as a big-brained mammal on the planet."

https://www.science.org/doi/10.1126/science.adq7055

SCIENCEADVISER – Cavern cannibals

Bones from a cave suggest that some 18,000 years ago, people in southern Poland had a taste for human flesh. "There's no doubt it's a case of cannibalism," one expert said.

https://www.nature.com/articles/s41598-025-86093-w

SCIENCE DAILY – Sharp look into Ockham's razor

A new article argues that by relying too much on parsimony in modelling, scientists make mistakes and miss opportunities.

https://www.sciencedaily.com/releases/2025/01/250128221131.htm

SCIENCE DAILY – The benefits of speaking multiple languages

New psychology research indicates that multilingual children may have enhanced cognitive skills.

https://www.sciencedaily.com/releases/2025/01/250129162136.htm

SCIENCE DAILY – How group size affects cooperation: Insights from brain science

New research challenges conventional wisdom that larger group size reduces cooperation by showing that fluid connections and innate prosocial instincts enable humans to thrive in larger social circles.

https://www.sciencedaily.com/releases/2025/01/250129121203.htm

SCIENCE DAILY – Don't know something? Apes can tell

To get treats, apes eagerly pointed them out to humans who didn't know where they were, a seemingly simple experiment that demonstrated for the first time that apes will communicate unknown information in the name of teamwork. The study also provides the clearest evidence to date that apes can intuit another's ignorance, an ability thought to be uniquely human.

https://www.sciencedaily.com/releases/2025/02/250203163756.htm

SCIENCE DAILY – Wealth is strong predictor of prosocial behavior around the world, study suggests

Wealthy people are more likely to engage in prosocial behavior such as donating money or volunteering, according to a new global study.

{And then there are outliers, like Elon Musk, and out-and-out liars, like Donald Trump.}

https://www.sciencedaily.com/releases/2025/02/250205131428.htm

SCIENCE DAILY – Missing link in Indo-European languages' history found

Where lies the origin of the Indo-European language family? Researchers contribute a new piece to this puzzle. They analyzed ancient DNA from 435 individuals from archaeological sites across Eurasia between 6.400--2.000 BCE. They found out that a newly recognized Caucasus-Lower Volga population can be connected to all Indo-European-speaking populations.

https://www.sciencedaily.com/releases/2025/02/250205130934.htm

SCIENCE.ORG NEWS – Who first spoke Indo-European? DNA points to Eurasian herders 6400 years ago

Long-awaited data sets pinpoint roots of the world's largest language family.

https://www.science.org/content/article/who-first-spoke-indo-european-dna-points-eurasian-herders-6400-years-ago

SCIENCE.ORG NEWS – Humpback whale songs are structured like human language

Languagelike patterns in whale songs could make them easier for whales to learn.
https://www.science.org/content/article/humpback-whale-songs-are-structured-human-language

PUBLICATIONS

Biology Letters

PAPERS

REBECCA OSCARSSON, JOHANNA GJØEN & PER JENSEN – Selection for tameness alters play-like behaviour in red junglefowl in line with effects of domestication

The phenotypic alterations brought by domestication have been hypothesized to be driven by selection for tameness. To explore this, we selected red junglefowl (RJF) for high (HF) and low (LF) fear of humans for 14 generations. We previously found that domesticated chickens performed more play-like behaviours during early ontogeny, and therefore, in this study, we explored potential effects of tameness. Groups of three to four chicks were randomly created from each selection line, and each group was moved to an enriched play arena twice per week, from day 6 until day 53 post-hatch. The frequency of 14 different play-like behaviours, categorized as locomotor, social and object play-like behaviour were recorded for 30 min at every observation instance. Every group of three or four birds constituted the independent statistical replicates and measures were averaged within the groups. The frequency of total play-like behaviour as well as object, and locomotor play-like behaviour was significantly higher in LF, while social play-like behaviour was significantly more common in HF. This largely mirrors previous observations of differences between domesticated and ancestral chickens. Hence, our results support the important role of tameness for the evolution of domesticated behaviour.
https://royalsocietypublishing.org/doi/full/10.1098/rsbl.2024.0607

Cell Stem Cell

PAPERS

KATARZYNA CIUBA et al – Molecular signature of primate astrocytes reveals pathways and regulatory changes contributing to human brain evolution

Astrocytes contribute to the development and regulation of the higher-level functions of the brain, the critical targets of evolution. However, how astrocytes evolve in primates is unsettled. Here, we obtain human, chimpanzee, and macaque induced pluripotent stem-cell-derived astrocytes (iAstrocytes). Human iAstrocytes are bigger and more complex than the non-human primate iAstrocytes. We identify new loci contributing to the increased human astrocyte. We show that genes and pathways implicated in long-range intercellular signaling are activated in the human iAstrocytes and partake in controlling iAstrocyte complexity. Genes downregulated in human iAstrocytes frequently relate to neurological disorders and were decreased in adult brain samples. Through regulome analysis and machine learning, we uncover that functional activation of enhancers coincides with a previously unappreciated, pervasive gain of “stripe” transcription factor binding sites. Altogether, we reveal the transcriptomic signature of primate astrocyte evolution and a mechanism driving the acquisition of the regulatory potential of enhancers.
https://www.cell.com/cell-stem-cell/fulltext/S1934-5909(24)00458-2

Current Biology

ARTICLES

MICHAEL GROSS – Migration in our genes

Humans have always migrated. After the major moves out of Africa and around the globe, further mass migration events have been linked to the spread of agriculture and of language families. A new analytical method now enables researchers to detect more subtle signatures of movements between genetically similar populations in Eurasia.
https://www.cell.com/current-biology/abstract/S0960-9822(25)00053-3

PAPERS

MATHIEU MALHERBE et al with CATHERINE CROCKFORD & ROMAN M. WITTIG – Signal traditions and cultural loss in chimpanzees

The horizontal transmission of cultural knowledge is a powerful mechanism of evolutionary change. Across taxa, group-specific cultural traditions are expressed in diverse contexts, such as foraging, tool use, self-care and socialization. These traditions arise when group members converge on specific behavioral phenotypes. When these behavioral phenotypes involve communicative signals, such as gestures, they are termed dialects. However, gestural dialects are rare in non-humans. Behavioral phenotypes and traditions can also be lost, a well-documented phenomenon in humans, but rarely documented in non-human animals. Here, we find that chimpanzee gestures produced in copulation solicitations show culturally established phenotypes and undergo cultural loss due to human-induced population decline.
https://www.cell.com/current-biology/fulltext/S0960-9822(24)01648-8

GABRIELLE C. COFFING et al – Cephalopod sex determination and its ancient evolutionary origin

Octopuses, squids, and cuttlefishes—the coleoid cephalopods—are a remarkable branch in the tree of life whose members exhibit a repertoire of sophisticated behaviors.1 As a clade, coleoids harbor an incredible variety of novel traits, including the most complex nervous system among invertebrates, derived camera-type eyes, and rapid adaptive camouflage abilities.2,3 The burst of evolutionary novelty that distinguishes cephalopods is even more striking in a phylogenetic context; cephalopods are a deeply diverged lineage that last shared a common ancestor with other extant molluscs in the Cambrian period, roughly 550 million years ago.4,5 With recent advances in genome sequencing technologies, we have the capability to explore the genomic foundations of cephalopod novelties. Here, using PacBio long-read sequencing of genomic DNA and Iso-Seq full-length mRNA sequencing, we provide a novel chromosome-scale reference genome and annotation for a female California two-spot octopus (O. bimaculoides). Our assembly reveals that the female octopus has just one sex chromosome, consistent with a ZO karyotype, whereas the male has two (ZZ), providing the first evidence of genetic sex determination in cephalopods. We use our assembly and annotation in combination with existing genomic information from other cephalopods to create the first whole-genome alignments from this group and demonstrate that the sex chromosome is of an ancient origin, before the radiation of extant cephalopods approximately 480 million years ago,4 and has been conserved to the present day in all cephalopod genomes available.
https://www.cell.com/current-biology/fulltext/S0960-9822(25)00005-3

STEVEN L. ELMLINGER, JACOB A. LEVY & MICHAEL H. GOLDSTEIN – Immature vocalizations elicit simplified adult speech across multiple languages

Learning to speak takes place during a prolonged period of immaturity, which confers advantages for communicative development. Social partners, required for survival in early development, afford feedback for immature vocalizations like babbling and early speech. Feedback, in the form of changes to the linguistic structure of adult speech in response to infant vocalizations, may guide the earliest stages of language acquisition. In a cross-linguistic study of 1,586 transcripts, spanning 13 languages from 5 language families, we investigated whether caregiver talk was consistently influenced by children's (aged 5–30 months) immature speech. Across languages, we found that most caregivers significantly simplified their linguistic structure in response to children's immature speech, resulting in reduced lexical diversity, shorter utterance lengths, and higher likelihoods of single-word utterances. Children's vocalizations elicited learnable language from caregivers, highlighting a potentially widespread feature of language use that is catalyzed by immature behavior. Thus, altriciality allows for immature speech to be a social tool, creating opportunities for learning during social interaction.
https://www.cell.com/current-biology/abstract/S0960-9822(24)01720-2

JERRY TANG & ALEXANDER G. HUTH – Semantic language decoding across participants and stimulus modalities

Brain decoders that reconstruct language from semantic representations have the potential to improve communication for people with impaired language production. However, training a semantic decoder for a participant currently requires many hours of brain responses to linguistic stimuli, and people with impaired language production often also have impaired language comprehension. In this study, we tested whether language can be decoded from a goal participant without using any linguistic training data from that participant. We trained semantic decoders on brain responses from separate reference participants and then used functional alignment to transfer the decoders to the goal participant. Cross-participant decoder predictions were semantically related to the stimulus words, even when functional alignment was performed using movies with no linguistic content. To assess how much semantic representations are shared between language and vision, we compared functional alignment accuracy using story and movie stimuli and found that performance was comparable in most cortical regions. Finally, we tested whether cross-participant decoders could be robust to lesions by excluding brain regions from the goal participant prior to functional alignment and found that cross-participant decoders do not depend on data from any single brain region. These results demonstrate that cross-participant decoding can reduce the amount of linguistic training data required from a goal participant and potentially enable language decoding from participants who struggle with both language production and language comprehension.
https://www.cell.com/current-biology/abstract/S0960-9822(25)00054-5

iScience

PAPERS

LORENZO FIORI et al – Balancing postural control and motor inhibition during gait initiation

This study examines the relationship between stopping a planned gait initiation due to sudden environmental changes and maintaining body stability. Using a gait initiation version of the Stop Signal Task (SST), we studied changes in anticipatory postural adjustments (APA) during gait initiation and suppression. We found that trial-level variables, such as the time to start or stop stepping, interacted with biomechanical factors like the center of mass displacement relative to the base of support, affecting performance. A critical biomechanical threshold was identified, beyond which stopping movement was unlikely. These findings highlight the strong link between limb action control and body equilibrium, offering a framework within a motor control paradigm. By integrating biomechanical elements, the model effectively simulates real-life scenarios, identifying key variables for studying neural correlations between action and postural control, and aiding in the development of injury prevention and rehabilitation tools for individuals with movement and posture impairments.

https://www.cell.com/iscience/fulltext/S2589-0042(25)00230-5

Journal of Linguistics

REVIEWS

NORBERT FRANCIS – Book Review
Review of Steven Mithen, 'The language puzzle: Piecing together the six-million-year story of how words evolved'. Basic Books, 2024.
https://www.cambridge.org/core/journals/journal-of-linguistics/article/abs/steven-mithen-the-language-puzzle-piecing-together-the-sixmillionyear-story-of-how-words-evolved-new-york-basic-books-2024-pp-viii-534/BD35D4A7B483051A3F3410DFAF2133D7

National Geographic

ARTICLES

BROOK LARMER – How a molar, jawbone, and pinkie are rewriting human history
Stunning discoveries and fresh breakthroughs in DNA analysis are changing our understanding of our own evolution and offering a new picture of the "other humans" that our ancestors met across Europe and Asia.
https://www.nationalgeographic.com/history/article/other-human-species-evolution

Nature

NEWS

Crowds suck people into a vortex — surprising physicists
Studying crowd dynamics could inform strategies that help to prevent dense gatherings from becoming dangerous.
https://www.nature.com/articles/d41586-025-00373-z

How one language family took over the world: ancient DNA traces its spread
Millennia-old genomes suggest Indo–European tongues originated from the Caucasus mountain region.
https://www.nature.com/articles/d41586-025-00382-y

Bonobos know when you're in the know — and when you're not
The apes can tailor their communications to account for a human partner's level of knowledge.
https://www.nature.com/articles/d41586-025-00326-6

ARTICLES

LEHTI SAAG & MAIT METSPALU – Genetic and geographical origins of Eurasia's influential Yamna culture
Ancient genomes from modern Ukraine and Russia reveal the origins of the Yamna people, pastoralists who migrated from the Eurasian steppe to Europe 5,000 years ago, spreading their ancestry, culture and, probably, language.
https://www.nature.com/articles/d41586-025-00089-0

ESTHER DUFLO AND KAILASH RAJAH – School smart or street smart? Maths skills of children in India tested
Do mathematical skills that children acquire in the classroom transfer to real-world settings — and vice versa? Evidence from five large groups of children in India reveals that current school-based teaching practices are failing to bridge the gap. An innovative approach is needed to connect abstract maths to intuitively meaningful contexts and problems.
https://www.nature.com/articles/d41586-025-00311-z

DEAN FALK – 'Taung Child' fossil offers clues about the evolution of childhood
A fossil found in South Africa 100 years ago provides insights into the emergence of a crucial — and unusual — life stage.
https://www.nature.com/articles/d41586-025-00294-x

PAPERS

IOSIF LAZARIDIS et mul with DAVID REICH – The genetic origin of the Indo-Europeans
The Yamnaya archaeological complex appeared around 3300 bc across the steppes north of the Black and Caspian Seas, and by 3000 bc it reached its maximal extent, ranging from Hungary in the west to Kazakhstan in the east. To localize Yamnaya origins among the preceding Eneolithic people, we assembled ancient DNA from 435 individuals, demonstrating three genetic clines. A Caucasus–lower Volga (CLV) cline suffused with Caucasus hunter-gatherer ancestry extended between a Caucasus Neolithic southern end and a northern end at Berezhnovka along the lower Volga river. Bidirectional gene flow created intermediate populations, such as the north Caucasus Maikop people, and those at Remontnoye on the steppe. The Volga cline was formed as CLV people mixed with upriver populations of Eastern hunter-gatherer ancestry, creating hypervariable groups, including one at Khvalynsk. The Dnipro cline was formed when CLV people moved west, mixing with

people with Ukraine Neolithic hunter-gatherer ancestry along the Dnipro and Don rivers to establish Serednii Stih groups, from whom Yamnaya ancestors formed around 4000 bc and grew rapidly after 3750–3350 bc. The CLV people contributed around four-fifths of the ancestry of the Yamnaya and, entering Anatolia, probably from the east, at least one-tenth of the ancestry of Bronze Age central Anatolians, who spoke Hittite. We therefore propose that the final unity of the speakers of 'proto-Indo-Anatolian', the language ancestral to both Anatolian and Indo-European people, occurred in CLV people some time between 4400 bc and 4000 bc.
https://www.nature.com/articles/s41586-024-08531-5

ABHIJIT V. BANERJEE et al with ELIZABETH S. SPELKE – Children's arithmetic skills do not transfer between applied and academic mathematics
Many children from low-income backgrounds worldwide fail to master school mathematics1; however, some children extensively use mental arithmetic outside school2,3. Here we surveyed children in Kolkata and Delhi, India, who work in markets (n = 1,436), to investigate whether maths skills acquired in real-world settings transfer to the classroom and vice versa. Nearly all these children used complex arithmetic calculations effectively at work. They were also proficient in solving hypothetical market maths problems and verbal maths problems that were anchored to concrete contexts. However, they were unable to solve arithmetic problems of equal or lesser complexity when presented in the abstract format typically used in school. The children's performance in market maths problems was not explained by memorization, access to help, reduced stress with more familiar formats or high incentives for correct performance. By contrast, children with no market-selling experience (n = 471), enrolled in nearby schools, showed the opposite pattern. These children performed more accurately on simple abstract problems, but only 1% could correctly answer an applied market maths problem that more than one third of working children solved (β = 0.35, s.e.m. = 0.03; 95% confidence interval = 0.30–0.40, P < 0.001). School children used highly inefficient written calculations, could not combine different operations and arrived at answers too slowly to be useful in real-life or in higher maths. These findings highlight the importance of educational curricula that bridge the gap between intuitive and formal maths.
https://www.nature.com/articles/s41586-024-08502-w

FRANÇOIS GU et al – Emergence of collective oscillations in massive human crowds
Dense crowds form some of the most dangerous environments in modern society. Dangers arise from uncontrolled collective motions, leading to compression against walls, suffocation and fatalities. Our current understanding of crowd dynamics primarily relies on heuristic collision models, which effectively capture the behaviour observed in small groups of people. However, the emergent dynamics of dense crowds, composed of thousands of individuals, remains a formidable many-body problem lacking quantitative experimental characterization and explanations rooted in first principles. Here we analyse the dynamics of thousands of densely packed individuals at the San Fermín festival (Spain) and infer a physical theory of dense crowds in confinement. Our measurements reveal that dense crowds can self-organize into macroscopic chiral oscillators, coordinating the orbital motion of hundreds of individuals without external guidance. Guided by these measurements and symmetry principles, we construct a mechanical model of dense-crowd motion. Our model demonstrates that emergent odd frictional forces drive a non-reciprocal phase transition7 towards collective chiral oscillations, capturing all our experimental observations. To test the robustness of our findings, we show that similar chiral dynamics emerged at the onset of the 2010 Love Parade disaster and propose a protocol that could help anticipate these previously unpredictable dynamics.
https://www.nature.com/articles/s41586-024-08514-6

Nature Africa

NEWS

The discovery that Africa is the birthplace of human evolution
Marking 100 years since Australopithecus Africanus transformed our understanding.
https://www.nature.com/articles/d44148-025-00013-8

ARTICLES

ENGELA DUVENAGE – Precious cargo: I carried a three-million-year-old tooth in my hand luggage
As we mark 100 years since Australopithecus africanus was first described, molecular scientist Palesa Madupe explains how palaeoproteomics cast light on the biology of South African hominins.
https://www.nature.com/articles/d44148-025-00019-2

ELSABÉ BRITS – The cave system that holds the key to our past
The Sterkfontein fossil deposit has been a treasure trove of discovery
https://www.nature.com/articles/d44148-025-00015-6

SIBUSISO BIYELA – Marking 100 years since the Taung discovery
Kimberleigh Tommy, head of the Paleontological Scientific Trust, reflects on changes in the study of paleontology in South Africa
https://www.nature.com/articles/d44148-025-00017-4

Nature Communications Biology

PAPERS

MENG LIANG, JOHANNES GERWIEN & ALEXANDER GUTSCHALK – A listening advantage for native speech is reflected by attention-related activity in auditory cortex
The listening advantage for native speech is well known, but the neural basis of the effect remains unknown. Here we test the hypothesis that attentional enhancement in auditory cortex is stronger for native speech, using magnetoencephalography. Chinese and German speech stimuli were recorded by a bilingual speaker and combined into a two-stream, cocktail-party scene, with consistent and inconsistent language combinations. A group of native speakers of Chinese and a group of native speakers of German performed a detection task in the cued target stream. Results show that attention enhances negative-going activity in the temporal response function deconvoluted from the speech envelope. This activity is stronger when the target stream is in the native compared to the non-native language, and for inconsistent compared to consistent language stimuli. We interpret the findings to show that the stronger activity for native speech could be related to better top-down prediction of the native speech streams.
https://www.nature.com/articles/s42003-025-07601-2

Nature Scientific Reports

PAPERS

FRANCESC MARGINEDAS et al – New insights of cultural cannibalism amongst Magdalenian groups at Maszycka Cave, Poland
The manipulation of human corpses started to become commonplace during the Upper Paleolithic. This well-documented behavior among Magdalenian peoples consists of perimortem manipulation and the removal of soft tissues and has been understood as forming part of the cultural repertoire of mortuary actions. The study of these practices has given rise to several interpretations with the consumption of human flesh (cannibalism) occupying a central position. The human assemblage of Maszycka Cave (18,000 cal. BP) is part of this ongoing debate. Although initial research in the 1990s suggested cannibalism, more recent studies challenge this interpretation arguing that the low incidence of human activity rule out the likelihood of processing for the purpose of consumption and proposing skull selection as a funerary practice. This study reviews the assemblage and presents previously unpublished postcranial skeletal specimens along with evidence of whole-body manipulation for consumption. This behavior is also observed in other chronologically and culturally similar assemblages throughout continental Europe, suggesting that cannibalism was integral practice within the cultural systems of these Magdalenian groups.
https://www.nature.com/articles/s41598-025-86093-w

Patterns

PAPERS

FRANS VAN DER SLUIS & EGON L. VAN DEN BROEK – Model interpretability enhances domain generalization in the case of textual complexity modeling
Machine learning has revolutionized text analysis, but this revolution has a price: deep learning sacrifices interpretability, making it hard, and often impossible, to understand how they work. At the same time, their ability to generalize to new tasks and domains remains a challenge, particularly when data shifts occur—changes in text genre, topic, and/or human judgment criteria. Our findings challenge the assumption that interpretability comes at the cost of performance and suggest that interpretable approaches offer unique advantages for modeling human judgments, particularly when training data are limited and/or generalization is required. We provide empirical evidence and a methodological framework to advance interpretable machine learning.
https://www.cell.com/patterns/fulltext/S2666-3899(25)00025-X

PNAS

PAPERS

LUKE A. TOWNROW & CHRISTOPHER KRUPENYE – Bonobos point more for ignorant than knowledgeable social partners
Numerous uniquely human phenomena, from teaching to our most complex forms of cooperation, depend on our ability to tailor our communication to the knowledge and ignorance states of our social partners. Despite four decades of research into the "theory of mind" capacities of nonhuman primates, there remains no evidence that primates can communicate on the basis of their mental state attributions, to enable feats of coordination. Moreover, recent reevaluation of the experimental literature has questioned whether primates can represent others' ignorance at all. The present preregistered study

investigated whether bonobos are capable of attributing knowledge or ignorance about the location of a hidden food reward to a cooperative human partner, and utilizing this attribution to modify their communicative behavior in the service of coordination. Bonobos could receive a reward that they had watched being hidden under one of several cups, if their human partner could locate the reward. If bonobos can represent a partner's ignorance and are motivated to communicate based on this mental state attribution, they should point more frequently, and more quickly, to the hidden food's location when their partner is ignorant about that location than when he is knowledgeable. Bonobos indeed flexibly adapted the frequency and speed of their communication to their partner's mental state. These findings suggest that apes can represent (and act on) others' ignorance in some form, strategically and appropriately communicating to effectively coordinate with an ignorant partner and change his behavior.
https://www.pnas.org/doi/full/10.1073/pnas.2412450122

Proceedings of the Royal Society B

PAPERS

LUCA G. HAHN et al – Pair-bond strength is consistent and related to partner responsiveness in a wild corvid
The need to maintain strong social bonds is widely thought to be a key driver of cognitive evolution. Cognitive abilities to track and respond to information about social partners may be favoured by selection if they vary within populations and confer fitness benefits. Here we evaluate four key assumptions of this argument in wild jackdaws (Corvus monedula), corvids whose long-term pair bonds exemplify one of the putative social drivers of cognitive evolution in birds. Combining observational and experimental behavioural data with long-term breeding records, we found support for three assumptions: (i) pair-bond strength varies across the population, (ii) is consistent within pairs over time and (iii) is positively associated with partner responsiveness, a measure of socio-cognitive performance. However, (iv) we did not find clear evidence that stronger pair bonds lead to better fitness outcomes. Strongly bonded pairs were better able to adjust hatching synchrony to environmental conditions but they did not fledge more or higher quality offspring. Together, these findings suggest that maintaining strong pair bonds is linked to socio-cognitive performance and may facilitate effective coordination between partners. However, they also imply that these benefits are insufficient to explain how selection acts on social cognition. We argue that evaluating how animals navigate trade-offs between investing in long-term relationships versus optimizing interactions in their wider social networks will be a crucial avenue for future research.
https://royalsocietypublishing.org/doi/full/10.1098/rspb.2024.2729

OLEG SOBCHUK & BRET BEHEIM – Does literature evolve one funeral at a time?
The cultural evolution of literary fiction is rarely studied, but rich literary data can help address some of the general problems of cultural change. In this article, we use a massive dataset of Anglophone fiction (over 23 000 books) and the tools of natural language processing to understand whether the long-term change of topics in books is driven by the individual change of authors or by the cohort turnover in author populations. To answer this question, we borrow a method from evolutionary ecology: decomposition analysis based on the Price equation. To prove the suitability of this method, we first apply it to simulated data and show that it does allow distinguishing between these two processes. Afterwards, we decompose the temporal trajectories of topics and measure the relative effects of the arrival of newcomer authors (entrances), the retirement of authors (exits) and the change of topic preferences during authors' lifetimes (individual change). We find that cohort turnover is a stronger force than individual change. Within the cohort effects, the effect of entrances is almost twice as strong as the effect of exits. Using simulated data, we discover that this difference stems from the unequal lengths of authors' careers.
https://royalsocietypublishing.org/doi/10.1098/rspb.2024.2033

Science

ARTICLES

ANDREW WHITEN & MASON YOUNGBLOOD – Convergent evolution in whale and human vocal cultures: The complex songs of humpback whales conform to fundamental laws of language
Culture pervades the lives of numerous animal species, in a great diversity of forms, but the songs of the humpback whale are among animal culture's most extraordinary manifestations. Sung only by males, the songs penetrate the ocean for many miles and are suspected to attract females for mating through their musical complexity. Year by year, the songs may become more complex and perhaps more alluring to females. However, in the southwestern Pacific, a totally new song emerges every few years that is adopted across the ocean. The rapidity with which new songs and variations are copied demonstrates that they are culturally transmitted, but the evolutionary forces that shape the complex song structures over time have remained mysterious. On page 649 of this issue, Arnon et al. report that fundamental laws identified in quantitative linguistics and in the culturally evolved learnability of human languages apply to whale song.
https://www.science.org/doi/10.1126/science.adv2318

PAPERS

INBAL ARNON et al with SIMON KIRBY – Whale song shows language-like statistical structure
Humpback whale song is a culturally transmitted behavior. Human language, which is also culturally transmitted, has statistically coherent parts whose frequency distribution follows a power law. These properties facilitate learning and may therefore arise because of their contribution to the faithful transmission of language over multiple cultural generations. If so, we would expect to find them in other culturally transmitted systems. In this study, we applied methods based on infant speech segmentation to 8 years of humpback recordings, uncovering in whale song the same statistical structure that is a hallmark of human language. This commonality, in two evolutionarily distant species, points to the role of learning and cultural transmission in the emergence of properties thought to be unique to human language.
https://www.science.org/doi/10.1126/science.adq7055

Science Advances

PAPERS

MASON YOUNGBLOOD – Language-like efficiency in whale communication
Vocal communication systems in humans and other animals experience selection for efficiency—optimizing the benefits they convey relative to the costs of producing them. Two hallmarks of efficiency, Menzerath's law and Zipf's law of abbreviation, predict that longer sequences will consist of shorter elements and more frequent elements will be shorter, respectively. Here, we assessed the evidence for both laws in cetaceans by analyzing vocal sequences from 16 baleen and toothed whale species and comparing them to 51 human languages. Eleven whale species exhibit Menzerath's law, sometimes with greater effect sizes than human speech. Two of the five whale species with categorized element types exhibit Zipf's law of abbreviation. On average, whales also tend to shorten elements and intervals toward the end of sequences, although this varies by species. Overall, the results of this study suggest that the vocalizations of many cetacean species have undergone compression for increased efficiency in time.
https://www.science.org/doi/10.1126/sciadv.ads6014

Trends in Cognitive Sciences

PAPERS

JESSIE C. TANNER & CLAIRE T. HEMINGWAY – Choice overload and its consequences for animal decision-making
Animals routinely make decisions with important consequences for their survival and reproduction, but they frequently make suboptimal decisions. Here, we explore choice overload as one reason why animals may make suboptimal decisions, arguing that choice overload may have important ecological and evolutionary consequences, and propose future directions.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(25)00003-8

KATHERINE MCAULIFFE, JULIA MARSHALL & ABBY MCLAUGHLIN – Beyond punishment: psychological foundations of restorative interventions
Work on the psychology of justice has largely focused on punishment. However, punishment is not our only strategy for dealing with conflict. Rather, emerging work suggests that people often respond to transgressions by compensating victims, involving third-party mediators, and engaging in forgiveness. These responses are linked in that they are involved in more restorative than retributive justice practices: they center victims as well as (or instead of) perpetrators and can help repair fractured relationships. Work with non-human animals echoes these findings: reconciliation and intervention by third parties play a key role in conflict management across taxa. In this review, we focus on these restorative interventions, with the aim of painting a more complete picture of the psychology of justice.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00320-6

HYEJIN J. LEE et al – Using precision approaches to improve brain-behavior prediction
Predicting individual behavioral traits from brain idiosyncrasies has broad practical implications, yet predictions vary widely. This constraint may be driven by a combination of signal and noise in both brain and behavioral variables. Here, we expand on this idea, highlighting the potential of extended sampling 'precision' studies. First, we discuss their relevance to improving the reliability of individualized estimates by minimizing measurement noise. Second, we review how targeted within-subject experiments, when combined with individualized analysis or modeling frameworks, can maximize signal. These improvements in signal-to-noise facilitated by precision designs can help boost prediction studies. We close by discussing the integration of precision approaches with large-sample consortia studies to leverage the advantages of both.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00229-8

IAN R. HADDEN et al – Why the belief in meritocracy is so pervasive
People worldwide tend to believe that their societies are more meritocratic than they actually are. We propose the belief in meritocracy is widespread because it is rooted in simple, seemingly obvious causal–explanatory intuitions. Our proposal suggests solutions for debunking the myth of meritocracy and increasing support for equity-oriented policies.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00329-2

JULIA LÖSCHNER & STEFFEN R. HAGE – Sound amongst the din: primate strategies against noise
Ambient noise disrupts vocal communication amongst animals. Recent studies show that some species, such as marmosets, can rapidly adjust the patterns of ongoing calls according to noisy environments. This substantial vocal flexibility reveals that non-human primates have more advanced cognitive control over when and what to vocalize than previously thought.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00314-0

YI PU, CLYDE FRANCKS & XIANG-ZHEN KONG – Global brain asymmetry
Lateralization is a defining characteristic of the human brain, often studied through localized approaches that focus on interhemispheric differences between homologous pairs of regions. It is also important to emphasize an integrative perspective of global brain asymmetry, in which hemispheric differences are understood through global patterns across the entire brain.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00268-7

COMMENTARIES

CHEN SONG – Understanding the qualitative nature of human consciousness
Understanding what conscious experiences feel like from a first-person perspective, known as the hard problem of consciousness, remains one of the most intriguing yet elusive topics in science and philosophy. In their timely article in TiCS, Fleming and Shea propose the quality space approach as a promising path forward. They suggest that the qualitative nature of consciousness can be studied by correlating the subjective similarity between stimulus-evoked conscious experiences with the similarity in neural activity patterns. While I support their endeavor, I wish to highlight two foundational challenges: first, how to infer the qualitative nature of consciousness from subjective similarity, and second, how to link the qualitative nature of consciousness to the nature of neural activity. These challenges represent key directions for future research, with new developments offering potential breakthroughs.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00265-1

KRZYSZTOF DOŁĘGA, INÈS MENTEC & AXEL CLEEREMANS – How does the quality space come to be?
In their recent opinion article, Fleming and Shea explore how different theories of consciousness fare in accounting for the structure of our phenomenology. Under the quality space hypothesis, each experience corresponds to a point in a multidimensional space instantiated over the activity of processing units (i.e., natural or artificial neurons). This way of thinking about representation is familiar to connectionists and it is indeed radically different from the hypothesis that mental representation always involves symbolic propositions. As Fleming and Shea delineate, one of the main consequences of such a conception of representation is that, in a sense, all representations are related in virtue of being instantiated over the same processing units in a distributed manner: Each representation is subtended by many units and each unit is involved in multiple representations. The quality space perspective suggests that what it means for me to see red is constituted by the functional similarity relationships that exist between the representations of red, blue, green, and so on.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00267-5

STEPHEN M. FLEMING & NICHOLAS SHEA – Empirical approaches to determining quality space computations for consciousness: a response to Dołęga et al. and Song
Our hope and aim with our recent article in TiCS was to provoke debate and research on the hypothesis that conscious experiences form quality spaces; thus, we were very pleased to receive letters from Dołęga, et al. and Song making constructive suggestions for taking this enquiry in new directions. Our focus was on how various computational theories of consciousness can accommodate the quality space hypothesis. Dołęga et al. make the helpful observation that this should also be investigated diachronically, both developmentally and during learning. Song points to valuable work that expands our methods for investigating quality spaces. She also argues that non-conventional approaches, such as Integrated Information Theory (IIT), will be needed to account for the qualitative character of consciousness. Work on IIT has been valuable in pointing to the importance of the phenomenon we grapple with in our paper (the potential interconnectedness of conscious experiences), which other theories of consciousness have tended to overlook. However, we respectfully disagree that tackling the phenomenon necessitates a non-conventional scientific approach.
[Original article: https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00165-7. See EAORC Bulletin 1,123.]
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00322-X

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