

EAORC BULLETIN 1,096 – 16 June 2024

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NOTICES

PUBLICATION ALERTS

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

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

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

EDITORIAL INTERJECTIONS

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

ACADEMIA.EDU – The Middle-Upper Paleolithic Transition Revisited

Marta Camps & Parth Chauhan (eds.), Sourcebook of Paleolithic Transitions, Springer Science, 273-281 (2009)

ROBERT G. BEDNARIK – The Middle-Upper Paleolithic Transition Revisited

Abstract The transition from tool industries traditionally seen as Middle Paleolithic to those perceived as Upper Paleolithic has for decades been assumed to coincide chronologically with the ‘replacement’ in Europe of the resident ‘Neanderthals’ by ‘invading’ ‘anatomically modern people’ from Africa. The basis of this belief is critically examined in view of recent developments in the dating of hominin remains in Europe, and in the exposure of fake datings of several key specimens. It is shown that there is no comprehensive evidence that any of the Early Upper Paleolithic traditions were introduced by fully modern hominins, but that there was instead a gradual process of gracilization rather than outright replacement evident in the fossil record. The same is shown to occur with tool industries and paleoart production, which develop progressively and gradually. The gradual change from robust to gracile skeletal architecture is not limited to Europe; it is a feature of all four continents occupied by humans 50,000 years ago. If the Aurignacian rock art and portable art in Europe is by robusts, such as Neanderthaloids, which appears to be the case, the various versions of the African Eve hypothesis must be considered to be refuted decisively.

https://www.academia.edu/13573714/The_Middle_Upper_Paleolithic_transition_revisited

NEWS

BBC – Elephants call to each other by name

Elephants call out to each other using their names, according to research from a new study.

<https://www.bbc.co.uk/newsround/articles/c988pz3q8qro>

NATURE BRIEFING – Call me by your (elephant) name

Elephants seem to use proper names to address their fellows — a habit that appears to otherwise be unique to humans.

Scientists used machine learning to analyse 469 deep rumbles made by wild female African savannah elephants (*Loxodonta africana*) and their families in Kenya. They found patterns that indicate that calls are specific to individuals. The researchers also played recorded calls to elephants out in the field and watched how the animals responded. “They could tell if a call was addressed to them just by hearing that call,” says behavioural ecologist and study co-author Michael Pardo.

<https://www.nature.com/articles/d41586-024-00797-z>

SCIENCEADVISER – All work and no play makes Flipper less likely to father calves

Dolphins are known to be a fun-loving bunch, but their frolicking has long baffled evolutionary biologists. Why expend so much energy on play? Perhaps because it prepares them for the future: A study by the Shark Bay Dolphin Research project in Australia finds that the most playful young male dolphins go on to father the most offspring.

Since 1982, scientists have observed some 200 male Indo-Pacific bottlenose dolphins in the clear waters of Shark Bay. About 20 years ago, they noticed that small groups of several juvenile males often engage in social play that is strikingly similar to adult male reproductive behaviors. In a dolphin version of tag, one member in the group is “it”, taking on the role of the fertile female, who swims off rapidly with the others in pursuit. The chasers try to swim side-by-side while making the adult sounds until the “it” dolphin flops on his back as if to say, “Come and get me.” All the other dolphins then jam into him, rubbing against him and lifting his tail out of the water, and touching his genital area. That’s game over; but as one game ends, another begins with a different youngster becoming “it.”

Tracking the paternity of 11 males over 22 years, the researchers found that juveniles who spent more time in the active, chaser role fathered more offspring than those playing “it.” “They’re practicing ... how to build strong social bonds, make allies, and how to get mates,” says behavioral biologist and lead author Kathryn Holmes. “They’re doing all of this play practice years before they will use it for real.”

<https://www.science.org/content/article/more-playful-young-male-dolphins-father-more-offspring>

SCIENCEADVISER – Don’t call him Dumbo

A study suggests elephants call each other by name, which may mean their social connections are much like our own.

<https://www.science.org/content/article/elephants-seem-use-names-call-one-another-humans-do>

SCIENCEADVISER – Whoops! Turns out failure doesn’t actually lead to success

To err is human, and it is often said that failure is a stepping stone to success. But do people actually learn from their mistakes? According to new research, the benefits of failure have been greatly exaggerated—and society is paying the price. To find out whether failure truly leads to success, members of the American Psychological Association conducted 11 different experiments with more than 1800 participants. The result? “People expect success to follow failure much more often than it actually does,” lead researcher Lauren Eskreis-Winkler explains in a statement.

In one experiment, people vastly overestimated the likelihood that lawyers, teachers, and other professionals would pass licensing exams after previously failing. In another, nurses overestimated the probability that their colleagues would learn from past mistakes. Many study participants also believed that heart failure patients would improve their health and people with addictions would get sober on their own, even though such assumptions rarely proved correct—a mindset that can have damaging real-world consequences.

When people learned the truth about failure, however, they tended to change their beliefs. In two experiments, participants were more likely to support taxpayer funding for inmate rehabilitation and drug treatment programs once they learned how low recovery rates are without them. Fixing our culture’s “misguided beliefs about failure,” Eskreis-Winkler says, could increase people’s motivation to tackle underlying societal issues—instead of using taxpayer money to punish those in need.

<https://psycnet.apa.org/doiLanding?doi=10.1037%2Ffxg0001610>

SCIENCEADVISER – Neuroscience is magic

How do you figure out how a parrot perceives the world? Why, perform a magic trick, of course—and see how the bird reacts. Some scientists are doing exactly that, and are learning a lot about animal cognition.

<https://knowablemagazine.org/content/article/living-world/2024/how-magic-can-help-us-understand-animal-minds>

SCIENCEADVISER – Quality expert’s findings fabricated

The bizarre tale of Steven Newmaster, the star botanist accused of plagiarism and other misconduct, has a new twist: The latest probe into his behavior finds “with high probability” that the scientist engaged in “data fabrication and falsification.”

<https://www.science.org/content/article/star-botanist-likely-made-data-about-nutritional-supplements-new-probe-finds>

SCIENCE DAILY – Juvenile dolphins who play together are more successful as adults

Juvenile social play predicts adult reproductive success in male bottlenose dolphins, a new study has found.

<https://www.sciencedaily.com/releases/2024/06/240610170927.htm>

SCIENCE DAILY – Interventions against misinformation also increase skepticism toward reliable sources

Efforts to tackle false information through fact-checking or media literacy initiatives increases the public's skepticism toward 'fake news'. However, they also breed distrust in genuine, fact-based news sources, a new study using online survey experiments in the US, Poland and Hong Kong shows.

<https://www.sciencedaily.com/releases/2024/06/240610140246.htm>

SCIENCE DAILY – Elephants have names for each other like people do, new study shows

Wild African elephants address each other with name-like calls, a rare ability among nonhuman animals, according to a new study. Researchers used machine learning to confirm that elephant calls contained a name-like component identifying the intended recipient, a behavior they suspected based on observation. The study suggests elephants do not imitate the receiver's call to address one another but instead use arbitrary vocal labels like humans.

<https://www.sciencedaily.com/releases/2024/06/240610140148.htm>

SCIENCE DAILY – Study on architecture of heart offers new understanding of human evolution

An international research team has uncovered a new insight into human evolution by comparing humans' hearts with those of other great apes.

<https://www.sciencedaily.com/releases/2024/06/240614141849.htm>

SCIENCE DAILY – Tiny New Zealand bird delivers a lesson in birdsong evolution

Scientists are rethinking the evolution of vocal learning in birds. New Zealand's smallest bird, the rifleman or titipounamu, may have a rudimentary version of the talent possessed by parrots, hummingbirds and songbirds.

<https://www.sciencedaily.com/releases/2024/06/240614141847.htm>

SCIENCE.ORG NEWS – Elephants seem to use names to call one another like humans do

Researchers behind a new study use artificial intelligence to tease unique identifiers in elephant calls.

<https://www.science.org/content/article/elephants-seem-use-names-call-one-another-humans-do>

SCIENCE.ORG NEWS – Magnetic minerals offer a finer grained look at when Neanderthals built fires

New technique can estimate time spans between ancient hearths to within decades.

<https://www.science.org/content/article/magnetic-minerals-offer-finer-grained-look-when-neanderthals-built-fires>

THE CONVERSATION – We've discovered a gene for trust – here's how it could be linked to good health

A gene can help explain why people who easily trust others have better health.

<https://theconversation.com/weve-discovered-a-gene-for-trust-heres-how-it-could-be-linked-to-good-health-231627>

THE CONVERSATION – Cracking the puzzle of the Singapore Stone's carvings

Despite its name, this sandstone slab is not a simple stone. It was once part of a monument, an ancient epigraph measuring three by three metres carrying about 50 lines of text.

<https://theconversation.com/the-singapore-stones-carvings-have-been-undeciphered-for-centuries-now-were-trying-to-crack-the-puzzle-231640>

THE CONVERSATION – Why we're so bad at spotting lies – most perform only slightly better than chance

Good liars can easily bypass classic lie detection stereotypes.

<https://theconversation.com/why-were-so-bad-at-spotting-lies-most-of-us-only-perform-slightly-better-than-chance-231749>

PUBLICATIONS

Academia Biology

PAPERS

DANIEL J.M. CROUCH & WALTER F. BODMER – Evolution by natural selection is a scientific law and not just a theory

The concept of evolution by natural selection was developed primarily by Darwin and Wallace in the 19th century as an explanation for the diversity and origin of complex organisms. They, however, did not have access to a mechanism of inheritance, which was needed for a proper understanding of how evolution by natural selection could work. Mendel's discovery of the basic laws of inheritance in diploid sexual organisms enabled Fisher, Haldane, and Wright to provide a theoretical framework for understanding the selective process of evolution by natural selection. The developing knowledge of prokaryotic microorganisms and the discovery of DNA or RNA as the fundamental basis of inheritance in all living organisms, together with Mendel's laws, now provide the four basic conditions for evolution by natural selection, namely reproduction that is stable, but allows for variation that can increase fitness in the broadest sense. These definitive conditions establish an exponential growth law for evolution by natural selection that applied initially for the longest period of time to the evolution of asexual clonal organisms, and through Mendel's laws, extends to bisexual multicellular organisms. It is mistaking evolution by natural selection to be a scientific theory rather than a law that has led to unnecessary disagreements over its fundamental validity and explanatory power.

“Evolution by natural selection is a scientific law and not just a theory”? I hope not. Newton gave us three laws of mechanics, which turned out to be useful approximations, not laws at all. Darwin gave us a theory which, over time, has been refined but never disproved; must more useful than a law.

<https://www.academia.edu/2837-4010/2/1/10.20935/AcadBiol6158>

American Journal of Biological Anthropology

PAPERS

RENEE D. BOUCHER et al with ROMAN M. WITTIG – Strontium isotopes track female dispersal in Taï chimpanzees

Chimpanzees (*Pan troglodytes*) are patrilocal, with males remaining in their natal community and females dispersing when they reach sexual maturity. However, the details of female chimpanzee dispersal, such as their possible origin, are difficult to assess, even in habituated communities. This study investigates the utility of $^{87}\text{Sr}/^{86}\text{Sr}$ analysis for (1) assessing Sr baseline differences between chimpanzee territories and (2) identifying the status (immigrant or natal) of females of unknown origin within the territories of five neighboring communities in Taï National Park (Côte d'Ivoire).

To create a local Sr isoscape for the Taï Chimpanzee Project (TCP) study area, we sampled environmental samples from TCP-established territories ($n = 35$). To assess dispersal patterns, 34 tooth enamel samples (one per individual) were selected from the Taï chimpanzee skeletal collection. $^{87}\text{Sr}/^{86}\text{Sr}$ analysis was performed on all 69 samples at the W.M. Keck Lab. The theoretical density and overlap of chimpanzee communities as well as generalized linear mixed models (GLMMs) were used to test each question.

$^{87}\text{Sr}/^{86}\text{Sr}$ ratios for natal male chimpanzees ranged from 0.71662 to 0.72187, which is well within the corresponding environmental baseline range of 0.70774–0.73460. The local Sr isoscapes fit was estimated with the root-mean-square error value, which was 0.0048 (22% of the whole $^{87}\text{Sr}/^{86}\text{Sr}$ data range). GLMMs identified significant differences in $^{87}\text{Sr}/^{86}\text{Sr}$ ratios between natal and unknown North community origin groups, suggesting that after 1980, females of unknown origin could be immigrants to North community ($n = 7$, z -ratio = -4.08 , $p = 0.0001$, power = 0.94).

This study indicates that $^{87}\text{Sr}/^{86}\text{Sr}$ analysis can successfully identify immigrant females in skeletal collections obtained from wild chimpanzee communities, enabling the tracking of female dispersal patterns historically. There are, however, significant limitations within the scope of this study, such as (1) the absence of reliable maps for the TCP study area, (2) limited capacity for environmental sampling, (3) small sample sizes, and (4) tooth formation in wild chimpanzees.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24981>

Biology Letters

PAPERS

PIOTR SOROKOWSKI et al – Is the perception of odour pleasantness shared across cultures and ecological conditions? Evidence from Amazonia, East Africa, New Guinea, Malaysia and Poland

What makes an odour pleasant or unpleasant? The inherent properties of the constituent chemical compounds, or the nose of the beholder, driven by idiosyncratic differences and culture-specific learning? Here, 582 individuals, including Tanzanian Hadza hunter-gatherers, Amazonian Tsimane' horticulturalists, Yali from the Papuan highlands and two industrialized populations (Poles, Malaysians), rated the pleasantness of 15 odour samples. We find considerable similarities in odour assessments across cultures, but our data do not fully support a claim regarding the universality of smell preferences. Despite cross-cultural similarities in olfactory assessments, probably driven by odour properties, we suggest that odour availability in ecological and cultural niches bears an undeniable effect on human odour preferences.

<https://royalsocietypublishing.org/doi/10.1098/rsbl.2024.0120>

BENJAMIN JONES & JOSEP CALL – Chimpanzees (*Pan troglodytes*) recognize that their guesses could be wrong and can pass a two-cup disjunctive syllogism task

When chimpanzees search for hidden food, do they realize that their guesses may not be correct? We applied a post-decision wagering paradigm to a simple two-cup search task, varying whether we gave participants visual access to the baiting and then asking after they had chosen one of the cups whether they would prefer a smaller but certain reward instead of their original choice (experiment 1). Results showed that chimpanzees were more likely to accept the smaller reward in occluded than visible conditions. Experiment 2 found the same effect when we blocked visual access but manipulated the number of hiding locations for the food piece, showing that the effect is not owing to representation type. Experiments 3 and 4 showed that when given information about the contents of the unchosen cup, chimpanzees were able to flexibly update their choice behaviour accordingly. These results suggest that language is not a pre-requisite to solving the disjunctive syllogism and provides a valuable contribution to the debate on logical reasoning in non-human animals.

<https://royalsocietypublishing.org/doi/10.1098/rsbl.2024.0051>

GEMA MARTIN-ORDAS – Inferential reasoning abilities in wild-caught bumblebees

The ability to make a decision by excluding alternatives (i.e. inferential reasoning) is a type of logical reasoning that allows organisms to solve problems with incomplete information. Several species of vertebrates have been shown to find hidden

food using inferential reasoning abilities. Yet little is known about invertebrates' logical reasoning capabilities. In three experiments, I examined wild-caught bumblebees' abilities to locate a 'rewarded' stimulus using direct information or incomplete information—the latter requiring bees to use inferential reasoning. To do so, I adapted three paradigms previously used with primates—the two-cup, three-cup and double two-cup tasks. Bumblebees saw either two paper strips (experiment 1), three paper strips (experiment 2) or two pairs of paper strips (experiment 3) and experienced one of them being rewarded or unrewarded. At the test, they could choose between two (experiment 1), three (experiment 2) or four paper strips (experiment 3). Bumblebees succeeded in the three tasks and their performance was consistent with inferential reasoning. These findings highlight the importance of comparative studies with invertebrates to comprehensively track the evolution of reasoning abilities, in particular, and cognition, in general.

<https://royalsocietypublishing.org/doi/10.1098/rsbl.2023.0561>

Frontiers for Young Minds

PAPERS

ALEJANDRO SÁNCHEZ-AMARO, DUSTIN EIRDOSH & DANIEL HAUN – Studying Great Apes and Cultural Diversity To Understand the Human Mind

Psychologists want to understand how the human mind is extraordinary among animal minds and where the unique aspects of human minds and behaviors come from. To build scientific understanding of human minds, we must study the wide range of humans across cultures, to know what all humans have in common and which aspects of human minds are diverse.

However, this is not enough—studying humans across cultures tells us how humans think and act, not how they are unique among animals. To understand how humans are similar and different from other animals, we must study other animals too, especially our close primate relatives, the great apes, who have minds that are similar to ours in many, but not all, ways. So, to understand human minds and behaviors, researchers should study humans and non-humans at a scale that allows us to explore the origins of the similarities and differences of minds and behaviors across our world today.

<https://kids.frontiersin.org/articles/10.3389/frym.2024.1337514>

Frontiers in Communication

PAPERS

ELISABET SERRAT et al – Expressive syntax matters for second-order false belief: a study with hearing-impaired children

While children with typical language development may capitalize on general language skills to grasp the content of others' minds, those with challenges in mind-reading could rather rely more specifically on complementation structures. However, most studies investigating mind-reading have focused on first-order false-belief reasoning, while much less is known about second-order false-belief, particularly for children that may present language difficulties, such as children with hearing impairment. This study aims to explore the link between language development and second-order false-belief in hearing-impaired children compared to their hearing counterparts. It seeks to ascertain whether mastering second-order false-belief requires the comprehension of complements or other language skills in hearing-impaired children, and if a distinct pattern emerges in their hearing peers. Children with hearing-impairment ($n = 22$) and a chronological age-matched control group ($n = 25$), ages 8–12, were administered a second-order false-belief task (carefully avoiding use of complements and highly visual). Alongside this, they completed assessments of expressive vocabulary, receptive and expressive syntax, recalling sentences, and a recursive sentential complements task. Correlational analysis revealed that in the control group only productive syntax was related to performance on the second-order false-belief task, while in the hearing-impaired group, expressive vocabulary, recalling sentences and sentential complements were related to second-order false-belief performance. These results show that vocabulary, recursive complements and expressive syntax are particularly important aspects for second-order false-belief success in children with hearing-impairment as compared to their hearing peers. These results shed light on how language and second-order false-belief understanding are related in their development.

<https://www.frontiersin.org/articles/10.3389/fcomm.2024.1401576/full>

Frontiers in Earth Science

PAPERS

ANGEL ZEININGER et al – Variable gearing at the ankle during walking in adults and young children: Implications for foot development and evolution

The human foot has evolved over the past seven million years from a relatively mobile, grasping appendage to a highly derived structure with a heel pad and longitudinal arch that can absorb shock at heel strike and weight-bearing yet also function as a powerful lever at toe-off. It has been proposed that the modern human foot evolved to allow our species to use "variable gearing" during walking and running. In this model, the gears of the human foot are defined relative to the ankle center of rotation as R , the distance from the ground reaction resultant vector, and r , the distance from the calf muscle vector. The gear ratio defines the torque generated to propel the body or stretch the triceps surae muscles. We test the hypothesis that variable gearing is associated with modern human pedal anatomy and a heel-to-toe rollover that allows a shift from "low gear" to "high gear" during stance.

Using force plate and video analysis, we examined variable gearing in adults and children engaging in adult heel strike (AHS = 35), flat foot contact (FFC = 39), or initial heel contact (IHC = 26).

Our hypothesis was partly supported. Although variable gearing was observed in IHC steps and was greater than in FFC steps, it was not as developed as in AHS steps. This may be related to anatomical and motor control differences between juvenile and adult feet, suggesting that adult anatomy, including a high arch, and neural control are critical for full use of variable gearing and that this feature would have evolved in later hominins around two million years ago with the appearance of a fully modern foot.

<https://www.frontiersin.org/articles/10.3389/feart.2024.1348921/full>

Frontiers in Human Neuroscience

PAPERS

SARI YLINEN et al – Establishing neural representations for new word forms in 12-month-old infants

During the first year of life, infants start to learn the lexicon of their native language. Word learning includes the establishment of longer-term representations for the phonological form and the meaning of the word in the brain, as well as the link between them. However, it is not known how the brain processes word forms immediately after they have been learned. We familiarized 12-month-old infants (N = 52) with two pseudowords and studied their neural signatures. Specifically, we determined whether a newly learned word form elicits neural signatures similar to those observed when a known word is recognized (i.e., when a well-established word representation is activated, eliciting enhanced mismatch responses) or whether the processing of a newly learned word form shows the suppression of the neural response along with the principles of predictive coding of a learned rule (i.e., the order of the syllables of the new word form). The pattern of results obtained in the current study suggests that recognized word forms elicit a mismatch response of negative polarity, similar to newly learned and previously known words with an established representation in long-term memory. In contrast, prediction errors caused by acoustic novelty or deviation from the expected order in a sequence of (pseudo)words elicit responses of positive polarity. This suggests that electric brain activity is not fully explained by the predictive coding framework.

<https://www.frontiersin.org/articles/10.3389/fnhum.2024.1386207/full>

Frontiers in Psychology

PAPERS

CARLIE M. HAY et al – F@#\$ pain! A mini-review of the hypoalgesic effects of swearing

Swearing, or the use of taboo language, has been repeatedly shown to induce hypoalgesia. While reliable hypoalgesic effects have been observed across studies, the mechanisms by which swearing influences pain and the optimal dosage of swearing remain poorly understood. Plausible mechanistic rationale for swearing's impact on pain include sympathetic response, emotion, humor, distraction, aggression, state disinhibition, psychological flow, risky behavior, and self-confidence. It remains unknown how the intensity of the swear word, speech volume, frequency, or timing influences pain modulation. While the majority of evidence demonstrates the efficacy of swearing at attenuating acute pain responses, these studies have utilized healthy populations with controlled experiments in laboratory settings. Comparatively, less is known about how laboratory findings translate practically/clinically to diverse populations, various dosages, and different pain chronicities. A greater understanding of mechanistic underpinnings and practical implications are necessary to feasibly implement swearing as a therapeutic modality to combat pain. The purpose of the following mini-review is to provide an overview of the current evidence on swearing for the reduction of pain, speculate on plausible underlying mechanisms, and discuss the potential for optimization of swearing for real-world translation. Lastly, identifying knowledge gaps to aid in directing future research will be discussed.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1416041/full>

Frontiers in Sociology

PAPERS

DEINERA EXNER-CORTENS et al – Homophobic beliefs and attitudes among mid-adolescent boys: exploring the ideas of hybrid masculinities

Homophobia is well-documented as key to social regulation of masculine behavior and practices in Western settings. Yet, empirical data from a number of Western settings has shown a decline in overt homophobic attitudes in the past decade, leading some to suggest that the nature of masculinities is also changing. However, theorizing on the changing nature of masculinities among adolescents has received limited quantitative attention. Research is needed to better understand shifts in adolescent masculinities in contemporary Western settings.

In this paper, we investigate the application of one newer approach to explore masculinities in context – hybrid masculinities – in a sample of cisgender, heterosexual, mid-adolescent boys in one province in Western Canada (N = 873, mean age (SD) = 14.39 (0.37)). Data were collected from nine cohorts of grade 9 youth over a 10-year period (2013–2022) as part of the baseline survey of an ongoing evaluation of a gender-transformative healthy relationships program.

We hypothesized that if the ideas of hybrid masculinities held in our sample, we would find that overt homophobic attitudes and adherence to related patriarchal norms (e.g., avoidance of femininity) would decline over this period, but that the use of homophobic name-calling would remain differentiated in terms of to whom it was directed (e.g., a friend, someone they thought was gay). We did find a significant decline in homophobic attitudes and norms related to emotional restriction and avoidance of femininity over the 10-year period, but also found that homophobic name-calling remained differentiated, with significantly higher name-calling toward a friend than toward someone the youth thought was gay. Thus, our hypotheses were supported. We discuss the implications of our findings for future theory and research on understanding adolescent masculinities in context.

<https://www.frontiersin.org/articles/10.3389/fsoc.2024.1347568/full>

Heliyon

PAPERS

YUAN-FU DAI et al – Congruent or conflicting? The interaction between emoji and textual sentence is not that simple!

As a Japanese graphic symbol widely used in the world, Emoji plays an important role in computer mediated communication. Despite its prevalent use, the interaction dynamics between emoji and textual sentences remain inadequately explored. Based on the emotional function of emoji, this study uses the indirect priming method to explore the emotional impact of emoji on subsequent text in computer mediated communication through two progressive behavioral experiments. The results show that: (1) Emoji positioned at the onset of a sentence induce an emotional priming effect; (2) The processing speed is slowest when emoji and text are emotionally conflicting, while in non-conflicting condition, the type of emoji moderates the processing of combined sentences; (3) The emotional influence of emoji plays an auxiliary role, and the valence of textual sentence plays a decisive role in emotional perception.

[https://www.cell.com/heliyon/fulltext/S2405-8440\(24\)09015-7](https://www.cell.com/heliyon/fulltext/S2405-8440(24)09015-7)

iScience

PAPERS

RISTO CONTE KEIVABU & TOBIAS WIDMANN – The effect of temperature on language complexity: Evidence from seven million parliamentary speeches

Climate change carries important effects on human wellbeing and performance, and increasingly research is documenting the negative impacts of out-of-comfort temperatures on workplace performance. In this study, we investigate the plausibly causal effect of extreme temperatures, i.e., out-of-comfort, on language complexity among politicians, leveraging a fixed effects strategy. We analyze language complexity in over seven million parliamentary speeches across eight countries, connecting them with precise daily meteorological information. We find hot days reduce politicians' language complexity, but not cold days. Focusing on one country, we explore marginal effects by age and gender, suggesting high temperatures significantly impact older politicians at lower thresholds. The findings propose that political rhetoric is not only driven by political circumstances and strategic concerns but also by physiological responses to external environmental factors. Overall, the study holds important implications on how climate change could affect human cognitive performance and the quality of political discourse.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)01331-2](https://www.cell.com/iscience/fulltext/S2589-0042(24)01331-2)

JOSE PÉREZ-NAVARRO et al – Early language experience modulates the tradeoff between acoustic-temporal and lexico-semantic cortical tracking of speech

Cortical tracking of speech is relevant for the development of speech perception skills. However, no study to date has explored whether and how cortical tracking of speech is shaped by accumulated language experience, the central question of this study. In 35 bilingual children (6 y.o.) with considerably bigger experience in one language, we collected electroencephalography data while they listened to continuous speech in their two languages. Cortical tracking of speech was assessed at acoustic-temporal and lexico-semantic levels. Children showed more robust acoustic-temporal tracking in the least experienced language, and more sensitive cortical tracking of semantic information in the most experienced language. Additionally, and only for the most experienced language, acoustic-temporal tracking was specifically linked to phonological abilities, and lexico-semantic tracking to vocabulary knowledge. Our results indicate that accumulated linguistic experience is a relevant maturational factor for the cortical tracking of speech at different levels during early language acquisition.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)01472-X](https://www.cell.com/iscience/fulltext/S2589-0042(24)01472-X)

Nature

NEWS

Do elephants have names for each other?

Machine learning and careful observation suggest that some of the animals' calls are specific to individuals, similar to a person's name.

<https://www.nature.com/articles/d41586-024-00797-z>

PAPERS**SUJAYA NEUPANE, ILA FIETE & MEHRDAD JAZAYERI – Mental navigation in the primate entorhinal cortex**

A cognitive map is a suitably structured representation that enables novel computations using previous experience; for example, planning a new route in a familiar space. Work in mammals has found direct evidence for such representations in the presence of exogenous sensory inputs in both spatial and non-spatial domains. Here we tested a foundational postulate of the original cognitive map theory: that cognitive maps support endogenous computations without external input. We recorded from the entorhinal cortex of monkeys in a mental navigation task that required the monkeys to use a joystick to produce one-dimensional vectors between pairs of visual landmarks without seeing the intermediate landmarks. The ability of the monkeys to perform the task and generalize to new pairs indicated that they relied on a structured representation of the landmarks. Task-modulated neurons exhibited periodicity and ramping that matched the temporal structure of the landmarks and showed signatures of continuous attractor networks. A continuous attractor network model of path integration augmented with a Hebbian-like learning mechanism provided an explanation of how the system could endogenously recall landmarks. The model also made an unexpected prediction that endogenous landmarks transiently slow path integration, reset the dynamics and thereby reduce variability. This prediction was borne out in a reanalysis of firing rate variability and behaviour. Our findings link the structured patterns of activity in the entorhinal cortex to the endogenous recruitment of a cognitive map during mental navigation.

<https://www.nature.com/articles/s41586-024-07557-z>

Nature Communications**PAPERS****KUAIKUAI DUAN et al – Differences in regional brain structure in toddlers with autism are related to future language outcomes**

Language and social symptoms improve with age in some autistic toddlers, but not in others, and such outcome differences are not clearly predictable from clinical scores alone. Here we aim to identify early-age brain alterations in autism that are prognostic of future language ability. Leveraging 372 longitudinal structural MRI scans from 166 autistic toddlers and 109 typical toddlers and controlling for brain size, we find that, compared to typical toddlers, autistic toddlers show differentially larger or thicker temporal and fusiform regions; smaller or thinner inferior frontal lobe and midline structures; larger callosal subregion volume; and smaller cerebellum. Most differences are replicated in an independent cohort of 75 toddlers. These brain alterations improve accuracy for predicting language outcome at 6-month follow-up beyond intake clinical and demographic variables. Temporal, fusiform, and inferior frontal alterations are related to autism symptom severity and cognitive impairments at early intake ages. Among autistic toddlers, brain alterations in social, language and face processing areas enhance the prediction of the child's future language ability.

<https://www.nature.com/articles/s41467-024-48952-4>

Nature Communications Biology**PAPERS****CLAUDIA ROSWANDOWITZ et al – Cortical-striatal brain network distinguishes deepfake from real speaker identity**

Deepfakes are viral ingredients of digital environments, and they can trick human cognition into misperceiving the fake as real. Here, we test the neurocognitive sensitivity of 25 participants to accept or reject person identities as recreated in audio deepfakes. We generate high-quality voice identity clones from natural speakers by using advanced deepfake technologies. During an identity matching task, participants show intermediate performance with deepfake voices, indicating levels of deception and resistance to deepfake identity spoofing. On the brain level, univariate and multivariate analyses consistently reveal a central cortico-striatal network that decoded the vocal acoustic pattern and deepfake-level (auditory cortex), as well as natural speaker identities (nucleus accumbens), which are valued for their social relevance. This network is embedded in a broader neural identity and object recognition network. Humans can thus be partly tricked by deepfakes, but the neurocognitive mechanisms identified during deepfake processing open windows for strengthening human resilience to fake information.

<https://www.nature.com/articles/s42003-024-06372-6>

BRYONY A. CURRY et al – Left ventricular trabeculation in Hominidae: divergence of the human cardiac phenotype

Although the gross morphology of the heart is conserved across mammals, subtle interspecific variations exist in the cardiac phenotype, which may reflect evolutionary divergence among closely-related species. Here, we compare the left ventricle (LV) across all extant members of the Hominidae taxon, using 2D echocardiography, to gain insight into the evolution of the human heart. We present compelling evidence that the human LV has diverged away from a more trabeculated phenotype present in all other great apes, towards a ventricular wall with proportionally greater compact myocardium, which was corroborated by post-mortem chimpanzee (*Pan troglodytes*) hearts. Speckle-tracking echocardiographic analyses identified a negative curvilinear relationship between the degree of trabeculation and LV systolic twist, revealing lower rotational

mechanics in the trabeculated non-human great ape LV. This divergent evolution of the human heart may have facilitated the augmentation of cardiac output to support the metabolic and thermoregulatory demands of the human ecological niche.

<https://www.nature.com/articles/s42003-024-06280-9>

Nature Ecology & Evolution

NEWS

African savannah elephants call one another by 'name'

Using a combination of machine learning and playback experiments in the field, we find that African savannah elephants address members of their family with individually specific, name-like calls. These 'names' are probably not imitative of the receiver's calls, which is similar to human naming but unlike known phenomena in other animals.

<https://www.nature.com/articles/s41559-024-02430-8>

PAPERS

MICHAEL A. PARDO et al – African elephants address one another with individually specific name-like calls

Personal names are a universal feature of human language, yet few analogues exist in other species. While dolphins and parrots address conspecifics by imitating the calls of the addressee, human names are not imitations of the sounds typically made by the named individual. Labelling objects or individuals without relying on imitation of the sounds made by the referent radically expands the expressive power of language. Thus, if non-imitative name analogues were found in other species, this could have important implications for our understanding of language evolution. Here we present evidence that wild African elephants address one another with individually specific calls, probably without relying on imitation of the receiver. We used machine learning to demonstrate that the receiver of a call could be predicted from the call's acoustic structure, regardless of how similar the call was to the receiver's vocalizations. Moreover, elephants differentially responded to playbacks of calls originally addressed to them relative to calls addressed to a different individual. Our findings offer evidence for individual addressing of conspecifics in elephants. They further suggest that, unlike other non-human animals, elephants probably do not rely on imitation of the receiver's calls to address one another.

<https://www.nature.com/articles/s41559-024-02420-w>

Nature Human Behaviour

PAPERS

KISHO OGASA et al – Decision uncertainty as a context for motor memory

The current view of perceptual decision-making suggests that once a decision is made, only a single motor programme associated with the decision is carried out, irrespective of the uncertainty involved in decision making. In contrast, we show that multiple motor programmes can be acquired on the basis of the preceding uncertainty of the decision, indicating that decision uncertainty functions as a contextual cue for motor memory. The actions learned after making certain (uncertain) decisions are only partially transferred to uncertain (certain) decisions. Participants were able to form distinct motor memories for the same movement on the basis of the preceding decision uncertainty. Crucially, this contextual effect generalizes to novel stimuli with matched uncertainty levels, demonstrating that decision uncertainty is itself a contextual cue. These findings broaden the understanding of contextual inference in motor memory, emphasizing that it extends beyond direct motor control cues to encompass the decision-making process.

<https://www.nature.com/articles/s41562-024-01911-x>

Nature Physics

ARTICLES

MARK BUCHANAN – Human intelligence is not computable

In his 1994 book *Shadows of the Mind*, physicist Roger Penrose offered an example of an intriguing deterministic dynamical system. Penrose considered the problem of determining whether a given set of polygonal shapes could tile the two-dimensional plane without leaving any gaps. As mathematicians have established, this question is non-computable; that is, no algorithmic process can answer it with certainty. An algorithm may give a 'yes' answer after a finite time, or may just go on computing forever, yielding no answer.

<https://www.nature.com/articles/s41567-024-02533-w>

Nature Reviews Neuroscience

ARTICLES

SABINE KRABBE – Lessons on predictive learning from the honeybee

Learning and memory are crucial for an organism's survival. These cognitive processes allow an animal to adapt its behaviour on the basis of previous experience, ensuring that it will approach sources of reward and avoid danger. Identifying the neural underpinnings of these mechanisms has been a major endeavour in neuroscience over recent decades.

<https://www.nature.com/articles/s41583-024-00835-9>

Nature Translational Psychiatry

PAPERS

EMIKO KOYAMA et al – Genetics of child aggression, a systematic review

Excessive and persistent aggressiveness is the most common behavioral problem that leads to psychiatric referrals among children. While half of the variance in childhood aggression is attributed to genetic factors, the biological mechanism and the interplay between genes and environment that results in aggression remains elusive. The purpose of this systematic review is to provide an overview of studies examining the genetics of childhood aggression irrespective of psychiatric diagnosis. PubMed, PsycINFO, and MEDLINE databases were searched using predefined search terms for aggression, genes and the specific age group. From the 652 initially yielded studies, eighty-seven studies were systematically extracted for full-text review and for further quality assessment analyses. Findings show that (i) investigation of candidate genes, especially of MAOA (17 studies), DRD4 (13 studies), and COMT (12 studies) continue to dominate the field, although studies using other research designs and methods including genome-wide association and epigenetic studies are increasing, (ii) the published articles tend to be moderate in sizes, with variable methods of assessing aggressive behavior and inconsistent categorizations of tandem repeat variants, resulting in inconclusive findings of genetic main effects, gene-gene, and gene-environment interactions, (iii) the majority of studies are conducted on European, male-only or male-female mixed, participants. To our knowledge, this is the first study to systematically review the effects of genes on youth aggression. To understand the genetic underpinnings of childhood aggression, more research is required with larger, more diverse sample sets, consistent and reliable assessments and standardized definition of the aggression phenotypes. The search for the biological mechanisms underlying child aggression will also benefit from more varied research methods, including epigenetic studies, transcriptomic studies, gene system and genome-wide studies, longitudinal studies that track changes in risk/ameliorating factors and aggression-related outcomes, and studies examining causal mechanisms.

<https://www.nature.com/articles/s41398-024-02870-7>

New Scientist

NEWS

Tiny great ape fossils identified as new species from Europe

A kneecap and two teeth found in Germany have been identified as belonging to a new species of ape from 11.6 million years ago, thought to have weighed as little as 10 kilograms.

<https://www.newscientist.com/article/2434752-tiny-great-ape-fossils-identified-as-new-species-from-europe/>

Evidence of consciousness in newborns has implications for their care

Babies cannot tell us what they are experiencing, so it is hard to know what they are conscious of. But new research suggesting they perceive the world consciously could change how we care for them.

<https://www.newscientist.com/article/mg26234950-100-evidence-of-consciousness-in-newborns-has-implications-for-their-care/>

PLoS Biology

ARTICLES

CAS W. COOPMANS, ANNA MAI & ANDREA E. MARTIN – “Not” in the brain and behavior

Negation is key for cognition but has no physical basis, raising questions about its neural origins. A new study in PLOS Biology on the negation of scalar adjectives shows that negation acts in part by altering the response to the adjective it negates.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002656>

PAPERS

ARIANNA ZUANAZZI et al with DAVID POEPEL – Negation mitigates rather than inverts the neural representations of adjectives

Negation mitigates rather than inverts the neural representations of adjectives

Combinatoric linguistic operations underpin human language processes, but how meaning is composed and refined in the mind of the reader is not well understood. We address this puzzle by exploiting the ubiquitous function of negation. We track the online effects of negation (“not”) and intensifiers (“really”) on the representation of scalar adjectives (e.g., “good”) in parametrically designed behavioral and neurophysiological (MEG) experiments. The behavioral data show that participants first interpret negated adjectives as affirmative and later modify their interpretation towards, but never exactly as, the opposite meaning. Decoding analyses of neural activity further reveal significant above chance decoding accuracy for negated adjectives within 600 ms from adjective onset, suggesting that negation does not invert the representation of adjectives (i.e., “not bad” represented as “good”); furthermore, decoding accuracy for negated adjectives is found to be significantly lower than that for affirmative adjectives. Overall, these results suggest that negation mitigates rather than inverts the neural representations of adjectives. This putative suppression mechanism of negation is supported by increased

synchronization of beta-band neural activity in sensorimotor areas. The analysis of negation provides a steppingstone to understand how the human brain represents changes of meaning over time.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002622>

PLoS One

PAPERS

NELOY KUMAR CHAKROBORTY et al – Behavioral and genetic correlates of heterogeneity in learning performance in individual honeybees, *Apis mellifera*

Learning an olfactory discrimination task leads to heterogeneous results in honeybees with some bees performing very well and others at low rates. Here we investigated this behavioral heterogeneity and asked whether it was associated with particular gene expression patterns in the bee's brain. Bees were individually conditioned using a sequential conditioning protocol involving several phases of olfactory learning and retention tests. A cumulative score was used to differentiate the tested bees into high and low performers. The rate of CS+ odor learning was found to correlate most strongly with a cumulative performance score extracted from all learning and retention tests. Microarray analysis of gene expression in the mushroom body area of the brains of these bees identified a number of differentially expressed genes between high and low performers. These genes are associated with diverse biological functions, such as neurotransmission, memory formation, cargo trafficking and development.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0304563>

ELIE MAALOULY et al – The effect of conversation on altruism: A comparative study with different media and generations

Despite the overwhelming evidence of climate change and its effects on future generations, most individuals are still hesitant to make environmental changes that would especially benefit future generations. In this study, we investigate whether dialogue can influence people's altruistic behavior toward future generations of humans, and how it may be affected by participant age and the appearance of the conversation partner. We used a human, an android robot called Telenoid, and a speaker as representatives of future generations. Participants were split among an old age group and a young age group and were randomly assigned to converse with one of the aforementioned representatives. We asked the participants to play a round of the Dictator Game with the representative they were assigned, followed by an interactive conversation and another round of the Dictator Game in order to gauge their level of altruism. The results show that, on average, participants gave more money after having an interactive conversation, and that older adults tend to give more money than young adults. There were no significant differences between the three representatives. The results show that empathy might have been the most important factor in the increase in altruistic behavior for all participants.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0301769>

Proceedings of the Royal Society B

PAPERS

LUCREZIA LONARDO et al – Dogs do not use their own experience with novel barriers to infer others' visual access

Despite extensive research into the Theory of Mind abilities in non-human animals, it remains controversial whether they can attribute mental states to other individuals or whether they merely predict future behaviour based on previous behavioural cues. In the present study, we tested pet dogs (in total, N = 92) on adaptations of the 'goggles test' previously used with human infants and great apes. In both a cooperative and a competitive task, dogs were given direct experience with the properties of novel screens (one opaque, the other transparent) inserted into identical, but differently coloured, tunnels. Dogs learned and remembered the properties of the screens even when, later on, these were no longer directly visible to them. Nevertheless, they were not more likely to follow the experimenter's gaze to a target object when the experimenter could see it through the transparent screen. Further, they did not prefer to steal a forbidden treat first in a location obstructed from the experimenter's view by the opaque screen. Therefore, dogs did not show perspective-taking abilities in this study in which the only available cue to infer others' visual access consisted of the subjects' own previous experience with novel visual barriers. We conclude that the behaviour of our dogs, unlike that of infants and apes in previous studies, does not show evidence of experience-projection abilities.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2023.2934>

AIDEN FORD et al – Caregiver greeting to infants under 6 months already reflects emerging differences in those later diagnosed with autism

As infants develop, caregivers adjust their behaviour to scaffold their infant's emerging skills, such that changes in infants' social abilities are expected to elicit changes in caregiver behaviour. We examined whether changes in the probability of infant-directed caregiving behaviour—specifically, greeting, a ubiquitous signal used by caregivers to initiate reciprocal interactions—differ between infant-caregiver dyads with an infant later diagnosed with autism and dyads with a neurotypically developing infant during infants' first 6 months. Using longitudinal data from 163 dyads, we found that caregivers in autism dyads (n = 40) used greeting less and at later infant ages than caregivers with a neurotypically

developing infant (neurotypical dyads, $n = 83$). Caregivers in dyads with infants at elevated familial genetic likelihood for autism who did not receive an autism diagnosis (EL-non-autism dyads, $n = 40$) showed no differences in greeting compared with neurotypical dyads. Socioeconomic status partially mediated the difference between autism and neurotypical dyads. These findings show that autism and socioeconomic status were associated with the mutually adapted dynamics of dyadic interaction beginning in the first postnatal weeks. Importantly, differences in caregiver greeting observed in autism dyads are not interpreted as suboptimal behaviour from caregivers but rather indicate how early emerging social differences related to autism, years before overt features are present, may alter social learning opportunities elicited by the infant.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.2494>

AXEL TIMMERMANN, ABDUL WASAY & PASQUALE RAIÀ – Phase synchronization between culture and climate forcing

Over the history of humankind, cultural innovations have helped improve survival and adaptation to environmental stress. This has led to an overall increase in human population size, which in turn further contributed to cumulative cultural learning. During the Anthropocene, or arguably even earlier, this positive sociodemographic feedback has caused a strong decline in important resources that, coupled with projected future transgression of planetary boundaries, may potentially reverse the long-term trend in population growth. Here, we present a simple consumer/resource model that captures the coupled dynamics of stochastic cultural learning and transmission, population growth and resource depletion in a changing environment. The idealized stochastic mathematical model simulates boom/bust cycles between low-population subsistence, high-density resource exploitation and subsequent population decline. For slow resource recovery time scales and in the absence of climate forcing, the model predicts a long-term global population collapse. Including a simplified periodic climate forcing, we find that cultural innovation and population growth can couple with climatic forcing via nonlinear phase synchronization. We discuss the relevance of this finding in the context of cultural innovation, the anthropological record and long-term future resilience of our own predatory species.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2024.0320>

Royal Society Open Science

PAPERS

TIAGO FALÓTICO et al – Nut-cracking success and efficiency in two wild capuchin monkey populations

Capuchins can employ several strategies to deal with environmental challenges, such as using stone tools to access encapsulated resources. Nut-cracking is customary in several capuchin populations and can be affected by ecological and cultural factors; however, data on success and efficiency are only known for two wild populations. In this work, using camera traps, we assessed palm nut-cracking success and efficiency in two newly studied wild bearded capuchin populations (*Sapajus libidinosus*) and compared them with other sites. We tested the hypothesis that the overall success and efficiency of nut-cracking would be similar between sites when processing similar resources, finding partial support for it. Although using hammerstones of different sizes, capuchins had a similar success frequency. However, efficiency (number of strikes to crack a nut) was different, with one population being more efficient. We also tested whether success and efficiency varied between sexes in adults. We predict adult males would be more successful and efficient when cracking hard nuts. We found no differences between the sexes in one site but found sex differences in the other, although also for the low-resistant nut, which was unexpected. Our data add to the knowledge of capuchin nut-cracking behaviour flexibility, variance and potential cultural traits.

<https://royalsocietypublishing.org/doi/10.1098/rsos.240161>

Science Advances

PAPERS

RYO TANIGUCHI et al – Sensory evidence for complex communication and advanced sociality in early ants

Advanced social behavior, or eusociality, has been evolutionarily profound, allowing colonies of ants, termites, social wasps, and bees to dominate competitively over solitary species throughout the Cenozoic. Advanced sociality requires not just nestmate cooperation and specialization but refined coordination and communication. Here, we provide independent evidence that 100-million-year-old Cretaceous ants in amber were social, based on chemosensory adaptations. Previous studies inferred fossil ant sociality from individual ants preserved adjacent to others. We analyzed several fossil ants for their antennal sensilla, using original rotation imaging of amber microinclusions, and found an array of antennal sensilla, specifically for alarm pheromone detection and nestmate recognition, sharing distinctive features with extant ants. Although Cretaceous ants were stem groups, the fossilized sensilla confirm hypotheses of their complex sociality.

<https://www.science.org/doi/10.1126/sciadv.adp3623>

Trends in Cognitive Sciences

PAPERS

NED BLOCK – What does decoding from the PFC reveal about consciousness?

Disputes between rival theories of consciousness have often centered on whether perceptual contents can be decoded from the prefrontal cortex (PFC). Failures to decode from the PFC are taken to challenge 'cognitive' theories of consciousness such

as the global workspace theory and higher-order monitoring theories, and decoding successes have been taken to confirm these theories. However, PFC decoding shows both too much and too little. Too much because cognitive theories of consciousness do not need PFC rerepresentation of perceptual contents since pointers to perceptual representations suffice. Too little because there is evidence that PFC decoding of perceptual content reflects postperceptual cognitive representation, such as thoughts that have those perceptual contents rather than conscious percepts.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(24\)00117-7](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00117-7)

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