EAORC BULLETIN 1,186 – 8 March 2026

CONTENTS

NOTICES

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

PUBLICATION ALERTS
If you have had a paper or book published, or you see something which would be of interest to the group, please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.
If there is a journal you feel I should be tracking on a regular basis, let me know.
And if you have any other ideas for extending the "EAORC experience", please contact me.

EDITORIAL INTERJECTIONS

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

NEWS

JOHN TEMPLETON FOUNDATION – The Allure of Magic: Discovering Joy in the Inexplicable

We live in an era of imminent explainability. We can explain how pathogens spread disease, what factors produce mental illness, and how fermentation makes dough rise. Once attributed to supernatural, divine, and moral forces, we can now elucidate these processes through clear scientific principles. Painstaking experimentation, education, and scholarly exchange have enabled humans to learn so much. And now, with the advent of generative artificial intelligence (AI), any one of us can explain even more, without years of studying or hours spent thinking. AI technology has the comprehensive capacity to promptly answer any question (rightly or wrongly), explain complex phenomena, and perform many functions exceeding human capabilities.

Truly, talking to large language models (LLMs) like ChatGPT, Claude, or Gemini can feel magical. But do these conversations also deprive us of opportunities for awe, wonder, and pure amazement? What is the cost of losing a sense of magic in the world—and how might we bring it back?

{If you only experience magic through mystery then you are – quite literally – missing the trick.}

https://www.templeton.org/news/the-allure-of-magic-discovering-joy-in-the-inexplicable

NATURE BRIEFING – LLMs roll over for academic fraud

All major large language models (LLMs) can be used to either commit academic fraud or facilitate junk science, a test of 13 models has found. Some were harder to coax into mischief than others: the most resistant to prompts about committing fraud was Anthropic's Claude. xAI's Grok, and early versions of OpenAI's GPT, performed the worst. "The most important thing that developers can learn is that guard rails are easily circumvented," says biomedical scientist Matt Spick, who has studied the surge in low-quality papers linked to LLMs "Especially when developers are creating LLMs that tend towards a simulation of being 'agreeable' to encourage user engagement."

https://www.nature.com/articles/d41586-026-00595-9

NATURE BRIEFING – Neanderthal dad, human mum

Genetic evidence from three Neanderthal (Homo neanderthalensis) specimens suggests female Homo sapiens and male Neanderthals mated more often than did male H. sapiens and female Neanderthals — an imbalance that helped to shape the human genome. Researchers found that the X chromosomes from the specimens had, on average, 62% more human DNA than non-sex chromosomes, which could be explained by a bias in mating. The bias could have been down to mate availability or cultural sanctions for certain combinations, says population geneticist Sohini Ramachandran.

https://www.science.org/doi/10.1126/science.aea6774

SCIENCEADVISER – You lick the back of my head, I'll lick the back of yours

Many mammals connect with friends and family through social grooming. These acts of friendly cleaning can have a big impact on an individual's health in addition to forging a lasting bond—one that can extend to more dire circumstances. If you trust someone to scratch your back, you may be able to trust them to have it when you need it most.

Among bats, none spend quite as much time grooming as vampire bats. A considerable amount of their awake time—about 5%—is spent licking other bats, and a considerable amount of bat researchers' awake time has been spent observing these interactions. For vampire bats, failing to snag a meal in a given night can be fatal. So, the animals have a number of reciprocal "food-sharing" relationships: Bats with which they'll share their meal. Grooming can allow bats to test out new potential dining partners, allowing them to see just how giving a friend is before relying on them in a pinch. But despite all the work done on vampire bat grooming and its social functions, no one had really asked the obvious question: Does it actually impact their hygiene?

To find out, researchers waded through more than 1500 social grooming events spread across over 60 hours of surveillance videos of common vampire bats at a research station in Panama, determining what area was licked: face, head, upper back, lower back, chest, belly, foot, arm, thumb, inside wing, or outside wing. Then, they found similar self-grooming events—ideally, by the same bat—and followed the same labeling scheme for 1515 instances of self-cleaning that the bats performed. Furthermore, they recorded whether the self-cleaning involved scratching or licking. Presumably, the bats only licked the parts of themselves that are easiest to reach. If social grooming is actually important, you'd expect the bats to groom others in the places that are hardest to reach.

And indeed, that's exactly what the team saw . Places that were rarely self-groomed—including the face, head, chest, and upper back—were among the most likely to be licked clean by another bat. "We have previously observed that vampire bats are sensitive to others' cues of need for grooming, such as wet/disturbed fur or self-grooming, and that they target foreign

objects like metal bands on the forearm," the team wrote. "Considering those observations together with the present study, it seems that vampire bats target social grooming towards areas that require cleaning, supporting the hypothesis that social grooming is a form of helping, rather than simply being a signal of motivation to affiliate or cooperate."
https://www.biorxiv.org/content/10.64898/2026.02.25.707567v2

PUBLICATIONS

Animal Behaviour
PAPERS

JÚLIA VASCONCELOS-ARAÚJO et al – Talking more and fighting less? Conflict management through acoustic signals in a cooperatively breeding species

In the absence of conflict management, competition for limited resources can lead to heightened aggression and can negatively affect fitness. However, acoustic signals may serve as a management mechanism to deescalate such events. In this study, the functional significance of submissive cries and chatters as conflict escalation-avoidance behaviours in four wild groups of cooperatively breeding common marmosets, Callithrix jacchus, was investigated. By experimentally manipulating food availability and distribution, the four groups were exposed to contrasting competitive scenarios. Both calls were uttered unidirectionally between marmoset dyads to indicate dominance (chatter) or subordination (submissive cry). They were frequent during more (71%) and less (29%) competitive scenarios and were associated with reduced physical aggression. Despite increased aggression in the more competitive trials when only one out of four experimental feeding sites contained a food reward, high-intensity, physical aggression remained infrequent. Although chattering individuals had more access to food, this was not observed when the individuals uttered submissive cries. Under limited food availability, a group's single breeding female chattered more often and used submissive cries less often than expected, while nonbreeding adult females showed the opposite pattern. Males uttered both call types less often than expected given their co-feeding opportunities. These findings are consistent with the social and breeding systems of common marmosets, in which female reproductive competition is high, leading females to vocalize more frequently during feeding-related interactions, while males invest heavily in cooperative infant care and vocalize less frequently. Results indicate that marmoset vocal signals can mediate foraging/feeding-related aggression effectively under limited resources, thereby supporting their role as escalation-avoidance behaviours in managing social conflict. By reducing the frequency of aggressive contests over food, these signals lower the risk of injury and destabilization of marmoset social relationships.
https://www.sciencedirect.com/science/article/pii/S0003347225003744

VITTORIA ROATTI et al – Growing up wild: social learning opportunities during foraging in immature baboons

Immature individuals may play an important role in group-level information transmission because they learn socially more than adults. However, little is known about social learning during development, particularly in nontool-using species. Our aim was to determine how immatures' social learning opportunities during foraging changed with age and differed between the sexes, and from whom immatures had more opportunities to learn. Behavioural data on 53 immature wild chacma baboons, Papio ursinus, were collected across 2 years, recording all behaviours associated with social learning in other species: observing others while foraging, inspecting or eating food dropped by others, sniffing others' mouths, stealing food from others, joining the same location that others are foraging and eating the same food. Results showed that immatures had relatively more opportunities to learn from others before and around the weaning period, but no sex differences were found. Immatures had more opportunities to learn from individuals in proximity when they were young, but their learning opportunities were limited to relatively more specific 'demonstrators' (that is, possible learning partners) when older. In general, immatures had relatively more opportunities to learn from grooming affiliates and individuals of a similar age as themselves. Immature males had less opportunities to learn from grooming partners compared with female peers. Finally, high-ranking immatures had greater opportunities to learn socially compared with low-ranking peers. The relatively greater social learning opportunities of immatures around weaning could improve their independent foraging competence before being weaned. In addition, tolerance, through shared proximity and grooming, may be important in determining from whom immatures have greater opportunities to learn. Baboons live in a matrilineal society with a high degree of nepotism; thus, the greater opportunities of immatures to learn from tolerant individuals may translate into a higher within-matriline versus across-matriline information spread, which could limit group-level information transmission.
https://www.sciencedirect.com/science/article/abs/pii/S0003347225003902

Biology Letters
PAPERS

HANNAH R. BROAD, GUILLAM E. MCIVOR & ALEX THORNTON – Socially learnt predator recognition in nestling jackdaws

Recognizing whether other species pose a threat is critical to survival. Learning from others avoids the need for dangerous encounters, so it can be particularly valuable, especially for young, vulnerable animals. Here, we tested whether young birds can learn socially about potential dangers even while still in the nest. Using playbacks, we presented wild jackdaw nestlings with calls from an unfamiliar predatory species (Eurasian goshawk) and an unfamiliar non-predator (American golden plover)

in association with either conspecific alarm calls, implying danger, or contact calls, a neutral stimulus. When predator calls were paired with jackdaw alarm calls, nestlings learned to increase their vigilance rates. By contrast, vigilance rates were unchanged after predator calls were paired with jackdaw contact calls. Responses to the non-predator were not affected by pairing with either alarm or contact calls. This indicates that jackdaw nestlings can socially learn about unfamiliar calls and raises the possibility that they may show a predisposition (or 'preparedness') towards learning fear-relevant stimuli. Understanding the interplay between preparedness and social learning in the development of anti-predator responses is increasingly important as anthropogenic influences are altering predator compositions.
https://royalsocietypublishing.org/rsbl/article/22/3/20250770/480675/Socially-learnt-predator-recognition-in-nestling

Current Biology
PAPERS
GANYU ZHANG et al – Ancient genomes provide insight into the Paleolithic-to-Neolithic transition in northern East Asia
The Paleolithic-to-Neolithic transition (PNT), which coincided with the Holocene warming trend after the last Ice Age, significantly transformed human cultural and genetic landscapes around the world. However, the genetic dynamics of this transitional period in northern East Asia have yet to be fully investigated. Here, we reported mitochondrial genomes from three individuals and genome-wide data from two individuals from the Donghulin site located in western Beijing, China (~11–9 thousand years ago). This represents the earliest genetic evidence, together with archaeological context, of Neolithization in northern East Asia. We identify a newly discovered deep northern East Asian (nEA) lineage represented by the ~11,000-year-old DHL_M1, which diverged early in the Late Pleistocene. We also identify the genetic changes at the Donghulin site over approximately 2,000 years during the post-glacial warming period. These findings highlight the genetic diversity and complex population dynamics during the Neolithization process in northern East Asia, indicating a unique PNT trajectory in this region.
https://www.cell.com/current-biology/fulltext/S0960-9822(26)00153-3

eLife
PAPERS
SARAH SILVERE et al – Toward neuroanatomical and cognitive foundations of macaque social tolerance grades
The macaque genus includes 25 species with diverse social systems, ranging from low to high social tolerance grades. Such interspecific behavioral variability provides a unique model to tackle the evolutionary foundation of primate social brain. Yet, the neuroanatomical correlates of these social tolerance grades remain unknown. To address this question, we expressed social tolerance grades within a novel cognitive framework and analyzed post-mortem structural scans from 12 macaque species. Our results show that amygdala volume is a subcortical predictor of macaques' social tolerance, with high tolerance species exhibiting larger amygdala than low tolerance ones. We further investigated the developmental trajectory of amygdala across social grades and found that intolerant species showed a gradual increase in relative amygdala volume across the lifespan. Unexpectedly, tolerant species exhibited a decrease in relative amygdala volume across the lifespan, contrasting with the age-related increase observed in intolerant species—a developmental pattern previously undescribed in primates. Taken together, these findings provide valuable insights into the cognitive, neuroanatomical, and evolutionary basis of primates' social behaviors.
https://elifesciences.org/articles/106424

Frontiers in Education
PAPERS
SARBINAZ KYLYSHPAYEVA et al – The structure for cultivating a philologist's linguistic identity via improvement of communicative abilities in language classes
This study examines how a philologist's linguistic identity can be cultivated through the systematic enhancement of communicative abilities in the context of university language education. The research focused on integrating cultural precedent phenomena (CPP)—culturally embedded idioms, allusions, and expressions—into the teaching of Russian and evaluating their impact on students' communicative performance and identity development. We hypothesized that embedding CPP in a structured pedagogical model would lead to superior communicative, lexical, and intercultural outcomes compared with traditional instruction. A cohort of philology students (n = 29) was divided into a control group (n = 14) and an experimental group (n = 15) and engaged in a 12-week instructional cycle within an exploratory mixed-methods design. Data was collected through diagnostic questionnaires, classroom observations, and performance-based assessments, and analyzed using mixed quantitative and qualitative methods. The results indicate that students in the experimental group showed substantially higher gains in speech fluency, lexical variety, pragmatic accuracy, and intercultural awareness than those in the control group. In addition, participants reported increased confidence in their linguistic self-identification and cultural affiliation, suggesting a positive association between CPP-based instruction and communicative development. The study outlines methodological considerations for incorporating culturally embedded language material into university curricula and provides preliminary evidence of how cultural precedent phenomena may support reflective and context-sensitive language learning.

https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2026.1749296/full

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Frontiers in Neural Circuits
PAPERS

YUUKI G. OKA & MASAKI ISODA – Brain mechanisms underlying self-other distinction for bodily self-recognition
Accumulating evidence indicates that single neurons in the primate brain specifically encode sensorimotor experience about the self or others. Although the self-other distinction has been a major focus of social neuroscience research, little is known about the underlying mechanisms that enable the recognition of bodily self. Here, we review the literature demonstrating that pre-reflective bodily self-recognition can be achieved through the spatiotemporally contingent integration of visual, somatosensory, and motor signals arising from sensorimotor experience. We propose a self-other inference model as a neural computation for self-other distinction, in which the likelihood of being oneself is updated constantly based on Bayesian causal inference using appearance, contingency, and perspective cues. The results of simulation incorporating a state-space point-process model revealed that our self-other inference model successfully captures the latent state representation about the self-other distinction from synthetic neural activity. We hypothesize that the self-other inference model is implemented by distinct brain areas that process individual cues and their integrative hubs. This hypothesis is experimentally testable using cutting-edge technologies such as area-specific or pathway-selective silencing.
https://www.frontiersin.org/journals/neural-circuits/articles/10.3389/fncir.2026.1781653/full

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Frontiers in Psychology
PAPERS

JUAN MANUEL GARCÍA-RUIZ et al – On the origin of our fascination with crystals
Crystals are fascinating structures of solid or liquid matter where atoms, molecules, and/or ions are, on average, arranged in a highly ordered lattice. It is well-documented that some of the earliest objects collected by our hominin ancestors, without evident practical purpose, were small quartz and calcite crystals. These crystals, measuring a few centimeters, had no known utility as weapons, tools, or ornaments. However, hominins appear to have appreciated these stones, collecting and transporting them from their place of discovery to their shelters. This behavior, registered as far back as 780,000 years ago, has been interpreted as early evidence of symbolic thought in much younger archaeological contexts. In this study, we adopted an experimental approach to investigate the factors underlying the nature of our ancestral fascination with crystals. We designed a series of experiments with enculturated chimpanzees, one of our two closest living nonhuman relatives, who share significant genetic and behavioral traits with humans. The experiments aimed to identify which physical properties of crystals might have attracted chimpanzees and hominins. Our results suggest that enculturated chimpanzees can identify and distinguish crystals from other types of stones. We found that transparency and geometric shape were the two attractors guiding chimpanzees. These properties are notably salient in the natural environments of both chimpanzees and hominins. Furthermore, the crystals elicited exploratory behaviors in the enculturated chimpanzees, who engaged in voluntary and intentional actions to investigate crystalline transparency and compare shape. We discuss the relevance of these findings for understanding hominin behavior, proposing that similar responses to crystals in hominins and non-hominin apes could reflect a shared cognitive predisposition. Our study provides insights into the potential role of crystal collection in cognitive evolution and highlights the significance of material properties in shaping early symbolic behaviors.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2026.1633599/full

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Frontiers in Public Health
PAPERS

WANHONG XIONG et al – Motivations, willingness, and gains: a qualitative study of experiences of helping behaviors among community-dwelling older adults in China using self-construal theory
Prosocial behaviors are important public health strategies for decreasing older people's social isolation and improving their social engagement and well-being. However, few studies have explored older Chinese people's helping behaviors. Therefore, this qualitative study was designed to explore the experiences of helping behaviors among community-dwelling older adults using self-construal theory, focusing on their motivations, willingness, and gains.
A descriptive qualitative study was conducted from July to September 2024 in Southwest China using semistructured, in-depth, in-person interviews. Participants were selected through purposive sampling method, and categories and subcategories were identified through content analysis method.
A total of twenty community-dwelling older adults participated in this study. Six categories and thirteen subcategories were extracted from the data analysis. The categories included (i) the individual self (intrinsic motivation and self-interested motivation); (ii) the relational self (driven by genetic factors and help people close to them); (iii) the collective self (responsibility and obligation and prioritizing collective interests); (iv) the beyond self (pure altruism and helping strangers discreetly); (v) perceived gains (intergenerational support, peer support, and positive emotions); and (vi) barriers to and facilitators of helping behaviors.
The results emphasized that the intrinsic motivations for helping behaviors among older people were mainly benevolence and empathy. However, the motivations and willingness to engage in helping behaviors differed and were complex for

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different recipients. Perceived intergenerational support, peer support, and positive emotions could be protective factors for them in maintaining long-term helping behavior. Therefore, increasing helping behaviors in daily life should be considered an effective public health measure for older people to obtain family and social support and promote their mental health.
https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2026.1759118/full

Mind & Language
PAPERS

PETER CARRUTHERS – The motoric theory of curiosity

What is the nature of curiosity? There are two types of accounts currently in the literature. According to one, curiosity is a metacognitive desire. According to the other, curiosity is a desire-like attitude that embeds a question as its content. The present paper proposes a third alternative, according to which curiosity directly motivates innate or learned investigative behavior. It makes such behavior seem attractive and renders subsequent learning rewarding. No questions are needed; nor is any contentious form of self-awareness required. The paper begins by critiquing the two existing theories, building on those criticisms to develop the motoric theory thereafter.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.70017

Nature Ecology & Evolution
CORRECTIONS

SHI-XIA YANG, MARÍA MARTINÓN-TORRES & MICHAEL PETRAGLIA – Publisher Correction: Palaeoanthropological evidence from China is changing the picture of hominin evolutionary history

Correction to: Nature Ecology & Evolution https://doi.org/10.1038/s41559-026-02983-w, published online 24 February 2026.
In the version of this article initially published, in Fig. 1a, in the label now reading ">1 Ma," the greater-than sign was missing. In the Acknowledgements, the National Natural Science Foundation of China grant number 42522206 was missing a digit "2." The figure and Acknowledgements are now updated in the HTML and PDF versions of the article.
https://www.nature.com/articles/s41559-026-03035-z

Nature Scientific Reports
PAPERS

MENG QI & YAP NGEE THAI – Cognitive salience features enhance multitask deep learning for pragmatic reasoning across cultures

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

Cross-cultural pragmatic reasoning requires computational systems to interpret implicit meanings and culturally-specific communication patterns beyond literal semantic comprehension. This study proposes a cognitive salience feature-driven multi-task deep learning model that integrates attention-based mechanisms mirroring human perceptual priorities with culture-conditioned gating for cross-cultural pragmatic inference. The model jointly optimizes four pragmatic reasoning tasks—implicature detection, speech act classification, politeness assessment, and cultural appropriateness evaluation—through dynamic task weighting and gradient conflict resolution strategies. Comprehensive experiments conducted on a multilingual corpus spanning eight cultural groups demonstrate that the proposed approach achieves 83.2% overall accuracy and 77.5% cross-cultural transfer accuracy, representing substantial improvements of 9.7 and 12.7% points respectively over standard multi-task learning baselines. Ablation studies confirm that cognitive salience mechanisms contribute 5.2% performance gain, while culture-conditioned processing enhances cross-cultural generalization. The model's learned salience patterns exhibit strong correlation (0.81) with theory-driven pragmatic markers, validating interpretability and theoretical grounding. This work advances computational pragmatics by demonstrating that human-inspired cognitive mechanisms significantly enhance artificial systems' cross-cultural reasoning capabilities.
https://www.nature.com/articles/s41598-026-40809-8

New Scientist
NEWS

Cannibalism may explain why some orcas stay in family groups

Fins washing up in the North Pacific suggest that orcas from one subspecies are snacking on other orcas, and researchers think that may explain their different social dynamics.
https://www.newscientist.com/article/2516860-cannibalism-may-explain-why-some-orcas-stay-in-family-groups/

ARTICLES

MICHAEL MARSHALL – When we interbred with Neanderthals, they were usually the fathers

Genetic evidence hints that there was a strong bias for male Neanderthals and female humans to mate, rather than any other combination.

https://www.newscientist.com/article/2517239-when-we-interbred-with-neanderthals-they-were-usually-the-fathers/

NPJ Heritage Science

PAPERS

IVONA DLÁBIKOVÁ, PAVEL POSPÍŠIL & SAM ILLINGWORTH – Rediscovered megalithic engravings in Slovakia: 3D reconstruction and comparative analysis of a forgotten Neolithic site

The engraved stones uncovered in 1988 in Holíč, western Slovakia, represent a little-known megalithic site of probable prehistoric origin, situated in an underexplored region of Europe. This study presents detailed reconstructions of three engravings using high-resolution lasergrammetry, archival photography and full-scale hand tracing. The motifs consist of a human figure with a tool, a probable animal and concentric circles. Geometric analysis suggests alignment of the engravings with symbolically significant anatomical points. Archaeoastronomical mapping indicates a westward orientation consistent with the summer solstice sunset. While the site lacks stratigraphic context due to post-discovery disturbance, stylistic comparisons link the carvings to Neolithic traditions in France, Italy and Scotland. These findings raise new questions about the eastern extent of Neolithic monumental culture. We advocate for the preservation of the Holíč stones and recommend further interdisciplinary investigation.

https://www.nature.com/articles/s40494-026-02399-6

Patterns

PAPERS

GEORGE VENGROVSKI et al – TweetyBERT: Automated parsing of birdsong through self-supervised machine learning

Deep neural networks can be trained to parse animal vocalizations—serving to identify the units of communication and annotating sequences of vocalizations for subsequent statistical analysis. However, current methods rely on human-labeled data for training. The challenge of parsing animal vocalizations in a fully unsupervised manner remains an open problem. Addressing this challenge, we introduce TweetyBERT, a self-supervised transformer neural network developed for the analysis of birdsong. The model is trained to predict masked or hidden fragments of audio but is not exposed to human supervision or labels. Applied to canary song, TweetyBERT autonomously learns the behavioral units of song, such as notes, syllables, and phrases—capturing intricate acoustic and temporal patterns. This approach of developing self-supervised models specifically tailored to animal communication may significantly accelerate the analysis of unlabeled vocal data.

https://www.cell.com/patterns/fulltext/S2666-3899(25)00339-3

PeerJ

PAPERS

GIRMA YOHANNIS BADE et al – Evaluating the capability of base and large-scale language models for multilingual sarcasm detection

Even though natural language understanding has made significant progress, language models still struggle to grasp sarcasm, a complex linguistic phenomenon that is influenced by cultural and contextual differences. This has even become much worse in multilingual settings. This study assesses the efficacy of base-scale pre-trained models (Bidirectional Encoder Representations from Transformers (BERT), Robustly Optimized BERT Pretraining Approach (RoBERTa), Unsupervised Cross-lingual Representation Learning at Scale (XLM-RoBERTa), and Distilled version of BERT (DistilBERT)) via task-specific fine-tuning, and large language models (LLMs) (GPT-4) in few-shot contexts, across three languages: English, Spanish, and Amharic. While we primarily focus on multilingual sarcasm detection, we also offer monolingual benchmarks to evaluate language-specific adaptations. Among fine-tuned models, RoBERTa-base has gained the highest multilingual generalization (F1: 0.82), while BERT outperforms in English (F1: 0.90), proving the English language adaptability in models. On the other hand, GPT-4o with a few-shot strategy has shown a limitation on sarcasm comprehension (F1: 0.65), even though it is better at interpreting language. This indicates that, although LLMs exhibit greater flexibility, base-scale models refined on task-specific data remain superior in detecting multilingual sarcasm. Finally, we believe this work gives useful tips for choosing a model when resources are limited and shows how important it is to have sarcasm detection systems that can adapt to different cultures.

https://peerj.com/articles/cs-3584/

TAHANI JASER ALAHMADI et al – Cross-modal emotion recognition with causality inference in human conversations

Emotion recognition plays an important role in a wide range of application domains. Although previous studies have made progress in this domain, they often fall short in achieving a better understanding of emotions and inferring their underlying causes. To address these limitations, we propose an emotion recognition framework that integrates visual, audio, and textual modalities within a unified architecture. The proposed framework integrates an adaptive cross-modal attention module to

capture inter-modal interactions. This module dynamically adjusts the contribution of each modality based on contextual relevance, enhancing recognition accuracy. Additionally, an emotion causality inference module uses a fine-tuned, trainable LLaMA2-Chat (7B) model to jointly process image and text data. This identifies word clues associated with the expressed emotions. Furthermore, a real-time emotion feedback module delivers instantaneous assessments of emotional states during conversations, supporting timely and context-aware interventions. The experimental results on four datasets, SEMAINE, AESI, ECF, and MER-2024, demonstrate that our method achieves improvements in F1-scores compared to baselines.
https://peerj.com/articles/cs-3629/

Physics of Life Reviews

PAPERS

CHRISTOPHER J. WHYTE et al with ANIL K. SETH & JAKOB HOHWY – On the minimal theory of consciousness implicit in active inference

The multifaceted nature of subjective experience poses a challenge to the study of consciousness. Traditional neuroscientific approaches often concentrate on isolated facets, such as perceptual awareness or the global state of consciousness and construct a theory around the relevant empirical paradigms and findings. Theories of consciousness are, therefore, often difficult to compare; indeed, there might be little overlap in the phenomena such theories aim to explain. Here, we take a different approach: starting with active inference, a first principles framework for modelling behaviour as (approximate) Bayesian inference, and building up to a minimal theory of consciousness, which emerges from the shared features of computational models derived under active inference. We review a body of work applying active inference models to the study of consciousness and argue that there is implicit in all these models a small set of theoretical commitments that point to a minimal (and testable) theory of consciousness.
https://www.sciencedirect.com/science/article/pii/S1571064525001617

THE ANH HAN et al – Cooperation versus social welfare

Understanding and promoting cooperative behaviour among self-interested individuals is a critical concern in physical, biological, and social sciences. Numerous foundational mechanisms for the evolution of cooperation have been identified, and these mechanisms have served as the basis for developing tools and interventions designed to sustain and enhance cooperative behaviour. However, since both foundational mechanisms and the derived tools and interventions often involve costs affecting individuals or institutions, striving for maximum cooperation can sometimes harm social welfare, defined as the total population payoff. Herein, we review existing evolutionary mechanisms for the evolution of cooperation as well as tools and interventions based on these mechanisms, emphasising the often-overlooked hidden costs that may lead to a misalignment between cooperation and social welfare. By explicitly incorporating these hidden factors into the models, we analyse the conditions under which they reduce social welfare, across a broad range of social dilemma games and evolutionary forces. Additionally, we review experimental studies that support and inform mathematical models and agent-based simulations. We highlight when considering social welfare is crucial, as misalignment is most likely to occur. Ultimately, we argue that social welfare, not just cooperation, should be the primary optimisation objective when designing interventions for social good. We also suggest several key directions to further explore this often-overlooked issue in the literature. Overall, we reveal that hidden costs often influence the alignment between cooperation and social welfare, challenging the common prioritisation of cooperation alone.
https://www.sciencedirect.com/science/article/pii/S1571064525001654

COMMENTARIES

HÉCTOR M. MANRIQUE & ANA MAGDALENA HURTADO – Informational inbreeding: a useful concept to add to extant evolutionary theories: Comment on "Homo informatio" by Michael J. Walker

Walker's "Homo informatio" offers a compelling and thought-provoking re-examination of our evolutionary past, presenting a deliberate departure from conventional paradigms and challenging the actualist perspective. The "Homo informatio" framework invites us to embrace a more nuanced, dynamic model of human evolution. We commend this bold deviation from received wisdom. It is implausible to conceive of human evolution as a linear, uninterrupted ascent up an intellectual ladder. Rather, the development of human cognition and social structures was likely characterized by irregular progress, iterative experimentation, and the sporadic invention and reinvention of tools, ideas, and practices. These innovations, often emerging from individual actors, only became culturally embedded when recognized by the group as functionally advantageous.
https://www.sciencedirect.com/science/article/pii/S1571064525001824

PLoS One
PAPERS

GUILLERMO TOMÁS, TERESA BAJO & ALEJANDRA MARFUL – Exploring episodic specificity induction on divergent thinking in children

Previous studies suggest that Episodic Specificity Induction (ESI) improves the recall of episodic details and facilitates transfer to other cognitive tasks requiring episodic thinking (i.e., divergent thinking). However, the only study examining an adapted future-oriented ESI in children has failed to show benefits in subsequent cognitive tasks. To investigate this, two experiments were conducted using the standard ESI protocol with children. Experiment 1 tested second graders, fifth graders, and young adults using children-adapted materials (i.e., TV cartoons), while Experiment 2 tested fifth graders using non-adapted materials. Both experiments confirmed that ESI improved the recall of episodic details compared to a control condition. Additionally, developmental differences in episodic recall in Experiment 1 disappeared after controlling for total verbal production, suggesting that children's episodic memory benefits when recalling materials that are child-friendly. Conversely, unexpected findings regarding transfer effect to divergent thinking revealed no transfer effects in Experiment 2 (non-adapted materials) and a significant increase in idea fluency and flexibility following the control condition in Experiment 1 (children-adapted materials). This result may be explained by a positive mood induction, as general questions accompanied by child-friendly videos could enhance creative performance following the control condition. These findings highlight the importance of carefully selecting and adapting ESI materials to children population in future studies.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0341294

PRATEEK K. SAHU et al – Re-examining hidden fitness: Female preferences for long-path songs in zebra finches

Female songbirds can evaluate male quality from secondary sexual characteristics such as songs. Studies have shown mixed findings on which acoustic features contribute to song attractiveness. In a 2024 study, Alam and colleagues introduced a holistic measure of song called "path length" and found that female zebra finches (Taeniopygia guttata) prefer long path length songs as compared to short path length songs. The original female-playback study was criticized for design limitations, notably its small sample size, and pseudoreplication. Here, we conducted a preregistered replication and extension study of the female preference for long vs. short path length songs. Our study will evaluate the robustness and generality of this preference.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0343886

ABLA ALAOUI-SOCE & DIANA I. TAMIR – Familiar story structures possess an evolutionary edge in memory

Human beings demonstrate a universal impulse to share and consume stories. Over generations of transmission, within and across cultures, stories have evolved to develop regularities in their internal structures. Here, we investigated how two features of story structure – coherence and familiarity – impact recall as participants retold a story 5 days in a row. We predicted that familiar and coherent structures would be more stable over retellings. We measured stability using two novel story similarity measures of the (1) degree of structural change within storytellers, and (2) similarity in remembered structure across storytellers. Study 1 first validated our story similarity measure. Studies 2 and 3 then tracked the evolution of stories that varied in coherence and familiarity, respectively, using novel stories adapted from the popular "Cinderella" structure. Results showed that all stories became more structurally stable across retellings, with stories moving in a consistent direction (i.e., towards a consistent final form). However, retellings of a story with a more coherent and familiar structure showed both greater stability within and similarity across minds than retellings of a story with an incoherent (Study 2) or unfamiliar structure (Study 3). Thus, using novel tools to measure story evolution, our findings suggest that familiarity and coherence of a story structure offered it an advantage in memory, both within and across minds.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0341671

DIANE A. AUSTRY, ELIZABETH RENNER & ZANNA CLAY – How do young children respond to the distress of others? Applying infrared thermography and behavioural analyses to examine the development of emotion contagion and empathy

Empathy is a core feature of the human social experience, underpinned by the sharing of and understanding of others' states. However, we know relatively little about its early development. Here, we used the emerging technique of infrared thermography, combined with behavioural observations, to investigate how young children (1–3 years old) respond to others' distress. We measured the emotional reactions – including changes in facial skin temperature and behavioural responses – of N = 30 typically developing children from British nurseries while they watched short video-vignettes of familiar and unfamiliar caregivers displaying emotional distress or neutral expressions. We hypothesised that children's facial temperature change and behavioural responses (including facial expressions and self-directed behaviours) would be stronger to distress than to neutral stimuli. Based on the social bias of empathy, we hypothesised that responses would be stronger towards familiar individuals as compared to unfamiliar. Results confirmed that children's thermal response at the nose bridge was stronger when observing someone in distress compared to the neutral control. Although model familiarity had only a weak effect, there was an effect of age, with younger infants showing stronger thermal responses to distress stimuli compared to older children. We found no effect on behavioural responses. We discuss implications of these results, including whether thermal-imagery may be a more sensitive measure of affective responding than behavioural measures, and the

importance of using multiple methods. By combining physiological and behavioural measures, this study contributes to theoretical and methodological advances into understanding how internal affective processes map onto external measures in early childhood, shedding light on the development of empathy.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0335537

MCKENNA LYNN LITYNSKI, SEAN FIELD & RANDALL HAAS – Ethnographic meta-analysis shows that thermoregulation activities predict needle and awl use in North America

Needles and awls are common artifacts in the perishable archaeological record. To understand behavioral motivations for their use, this study examines ethnographic activities linked to needles and awls in North America. We hypothesize that thermoregulation would have been the strongest driver of perforator use. Ethnographies from eHRAF World Cultures are examined to evaluate activity types and temperature effects on the prevalence of perforator use. We observe that the sum of non-thermoregulation activities (69%) account for the majority of ethnographic perforator occurrences. Such activities include tattooing, medical suturing, basketry, and ceremonial activities among others. Nonetheless, the most prevalent activity identified is clothing production, accounting for 14% of ethnographic observations. We furthermore observe from a series of linear mixed-effect models that account for spatial autocorrelation that the probability of perforator observations increases at the coldest temperatures and decreases at the warmest, with a 52% probability of observing perforator tools ethnographically at −35.5°C and a 37% probability of observing perforators where temperatures reach +12.9°C. These results support the hypothesis that thermoregulation, particularly clothing manufacture, was a major driver of perforator tool use while simultaneously revealing that such tools were also commonly deployed in a wide array of activities. Such findings provide insight into the environmental and socio-cultural factors that influenced the use of perforators and thus inform our understanding of an artifact class that is increasingly observed in the archaeological record.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0343888

LARA GONZÁLEZ CARRETERO et al – Selective culinary uses of plant foods by Northern and Eastern European hunter-gatherer-fishers

Carbonised food deposits preserved in pottery vessels, often termed 'foodcrusts,' are frequently encountered on hunter-gatherer-fisher (HGF) pottery throughout Northern and Eastern Europe. While lipid residue analysis is frequently employed to determine their composition, this technique favours the identification of animal products. In this study, we present a combined analytical approach, including high resolution microscopic analysis (Digital Microscopy and Scanning Electron Microscopy) together with molecular and isotopic analysis of lipids (GC-MS and GC-C-IRMS) and bulk isotope analysis (EA-IRMS) to further understand the composition of foodcrusts. Eighty-five pottery vessels with foodcrusts were analysed from 13 archaeological sites dating from the 6th to the 3rd millennium BC, of which 58 have allowed for identification of plant tissues, such as wild grasses and legumes, fruits, and the roots, tubers, leaves and stems of herbaceous plants. The results demonstrate that the choice of plant foods was remarkably selective, with hunter-gatherers favouring certain plant species and even their parts over others and combining these with specific animal ingredients. The results also reveal that our knowledge of plant processing in pottery is likely to be grossly under-represented by relying on lipid residue analysis alone.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0342740

CORRECTIONS

SAHRA TALAMO, JEAN-JACQUES HUBLIN & PONTUS SKOGLUND – Correction: Boomerang and bones: Refining the chronology of the Early Upper Paleolithic at Obłazowa Cave, Poland

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https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0344302

Proceedings of the Royal Society B

PAPERS

STEPHAN ZAHNO et al – Humans can learn bimodal priors in complex sensorimotor behaviour

Bayesian integration offers a powerful unifying framework for perception, cognition and motor control. Extensive laboratory-based research shows that humans integrate sensory inputs and prior expectations in a Bayesian manner to guide action. However, it remains unclear whether this extends to naturalistic tasks involving more complex movements and environmental statistics. Here, we examine whether humans can learn bimodal priors in a complex sensorimotor task: returning tennis serves. Participants returned serves in an extended reality set-up with task demands closely matching real tennis. The opponent's serve locations followed a bimodal (i.e. two-peaked) distribution. We manipulated visual uncertainty through three ball speeds. After extensive exposure to the opponent's serves, participants' movements were systematically biased by the bimodal prior distribution. Consistent with Bayesian theory, the magnitude of the bias scaled with uncertainty. In addition to prior expectations, our data show that participants' movements were also biased by biomechanical constraints and motor costs. Intriguingly, explicit knowledge tests revealed that participants incorporated prior knowledge of the

opponent's serve distribution into their behaviour without explicit awareness of the pattern. These findings demonstrate that humans can implicitly acquire and exploit bimodal priors in complex, naturalistic sensorimotor behaviour.
https://royalsocietypublishing.org/rspb/article/293/2066/20252296/480548/Humans-can-learn-bimodal-priors-in-complex

TIMOTHY CASON et al – Local competition promotes hurtful behaviour towards unknown others

Humans frequently cooperate to achieve benefits unattainable through selfish behaviour. Punishment of free-riders is key for sustaining cooperation, but it is also costly, raising questions about the origins of such behaviour. Some evolutionary models suggest that individuals may be willing to hurt unknown others in competitive environments. However, empirical evidence about the effect of the scale of competition on strategies involving hurtful behaviour in human groups, such as spite, retaliation for hurting and punishment of free-riders, is missing. Using a laboratory experiment, we manipulate the scale of competition to investigate its influence on hurtful and helpful behaviours, between unknown humans in an indirect reciprocity game. We observe distinct behavioural patterns between local and global competition. When competition is local and thus confined to take place within isolated groups, we find frequent hurting as an expression of spite and retaliation. In contrast, when competition extends globally across several groups, hurting is used primarily for punishment of free-riders, whereas helping behaviour is rewarded, which together promotes cooperation. Thus, while isolated competition fosters inefficient, anti-social behaviour, global competition encourages pro-sociality and cooperation.
https://royalsocietypublishing.org/rspb/article/293/2066/20252490/480564/Local-competition-promotes-hurtful-behaviour

Science Advances

PAPERS

CHAOQIAN WANG & QI SU – Public goods games on any population structure

Understanding the emergence of cooperation in social networks has advanced through pairwise interactions, but the corresponding theory for group-based public goods games (PGGs) remains less explored. Here, we provide theoretical conditions under which cooperation thrives in PGGs on arbitrary population structures, which are accurate under weak selection. We find that a class of networks that would otherwise fail to produce cooperation, such as star graphs, are particularly conducive to cooperation in PGGs. More generally, PGGs can support cooperation on almost all networks, which is robust across all kinds of model details. This fundamental advantage of PGGs derives from self-reciprocity realized by group separations and from clustering through second-order interactions. We also apply PGGs to empirical networks, which shows that PGGs could be a promising interaction mode for the emergence of cooperation in real-world systems.
https://www.science.org/doi/10.1126/sciadv.aeb1263

Trends in Cognitive Sciences

PAPERS

M.J. CROCKETT & LISA MESSERI – AI Surrogates and illusions of generalizability in cognitive science

Recent advances in artificial intelligence (AI) have generated enthusiasm for using AI simulations of human research participants to generate new knowledge about human cognition and behavior. This vision of 'AI Surrogates' promises to enhance research in cognitive science by addressing longstanding challenges to the generalizability of human subjects research. AI Surrogates are envisioned as expanding the diversity of populations and contexts that we can feasibly study with the tools of cognitive science. Here, we caution that investing in AI Surrogates risks entrenching research practices that narrow the scope of cognitive science research, perpetuating 'illusions of generalizability' where we believe our findings are more generalizable than they actually are. Taking the vision of AI Surrogates seriously helps illuminate a path toward a more inclusive cognitive science.

{The Turing test was never a test of the humanness or awareness or consciousness of an algorithm, it tests whether humans can be fooled into believing the algorithm is a human being. With AI, just remember: "I Can't Believe it's not Butter" is not butter regardless of whether I can't believe it's not butter or not.}
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00251-7

Trends in Ecology and Evolution

PAPERS

YORICK LAMBREGHTS et al – The prenatal foundations of kin recognition

Kin recognition, the ability to identify genetic relatives, relies on familiarisation for the creation of recognition templates. During development, parent and embryo(s) are exposed to chemical, auditory, and tactile cues that can communicate reliable genetic information. We discuss how these cues can have organisational effects during a time of heightened phenotypic sensitivity, creating postnatal kin preferences. As familiarisation is often determined by the prenatal social environment, we argue that reproductive traits that alter the social context of the prenatal environment, such as reproductive mode, could facilitate the evolution of kin recognition. Furthermore, we outline how these effects of prenatal familiarisation can extend beyond kin recognition and play a pivotal role in the emergence and evolution of complex social behaviors.
https://www.cell.com/trends/ecology-evolution/abstract/S0169-5347(25)00351-9

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