

EAORC BULLETIN 1,027 – 19 February 2023

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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.

RESEARCHGATE – Grandmother Hypothesis

In J. Vonk, T. K. Shackelford (eds.), Encyclopedia of Animal Cognition and Behavior. Springer Nature (2019).

ANASTASIA KRASHENNIKOVA – Grandmother Hypothesis

The grandmother hypothesis is a theory explaining why longer post-reproductive life span has developed in human evolution and why infertility in old age can be an evolutionary benefit for females.

<https://www.researchgate.net/publication/334291416> Grandmother Hypothesis

RESEARCHGATE – How to breathe

In Journal of Global Faultlines 9:2, 126-137 (2022).

CAMILLA POWER – How to breathe

For Marx, all forms of economics could be reduced to “an economics of time”. To restore a sustainable rhythm to our planet, our lifeways and economy, we need to decolonize time. The first part of this essay sketches a history of capitalism as robbery: ever tighter control of time yielding greater economic exploitation and inequality. The second part asks how we could reorganize and redistribute time. What can indigenous and egalitarian societies teach us today about the passage of time? What biological and cultural resources do we have for slowing down the rhythms of our economy and redistributing time? The evolution of women’s reproductive cycles and the lunar calendars shared by world religions give evidence for a deep time human lunar ecology.

<https://www.researchgate.net/publication/368510580> How to breathe

CONFERENCE ALERT – European Human Behaviour and Evolution Association 2023 Conference

EHBEA's 2023 Annual Conference will be held at University College London, UK, on 18 April - 21 April 2023. Registration is now open. Members can register for the conference by visiting the EHBEA Events page:

<https://click.updates.cambridge.org/?qs=d265075bbe06d7f6222d097b00b48e8c5394b1b4e3adf1de8063651cd253cb91c8e0081d86a9c8680c7124788a3c819c>

Alternatively, you can register at a later date, but you must be a 2023 member to attend the conference:

<https://click.updates.cambridge.org/?qs=d265075bbe06d7f67fd8828330a5c69a678bb04657e3d18a89a651aea1329ca2259b523069a03e4f3905be22f70210ee>

For more information about the conference, please visit the EHBEA 2023 Conference website:

<https://click.updates.cambridge.org/?qs=d265075bbe06d7f6319c66113607f61d811813a9fe29ac5140ffec68c80e81c81ff404d0a1b3508740dcedde7177625>

Contact & Assistance

Our membership team is happy to support you with any queries you may have about conference registration.

Please contact:

UK: +44 (0) 1223 326085

Or email: memberservices@cambridge.org

NEWS

NATURE BRIEFING – Can peer review be fixed?

In the face of skyrocketing numbers of papers and pandemic burnout among researchers, journal editors are struggling to find willing peer reviewers. Surveys indicate that most scientists consider peer review to be their academic duty and don't seek payment, but many chafe at working for free for journals — Nature among them — that benefit. Individuals have found their own ways forward: perhaps by reviewing only for non-profit journals, or by spending their energy on preprints. But the path for science as a whole is uncertain. “I think the notion that we have to review every paper might be a bit utopic,” says reproducibility researcher Olavo Amaral. “I think the system itself might be untenable.”

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=89dbaf763f&e=1db4b9a19b>

NATURE BRIEFING – The lives of Ice Age children

In prehistoric times, children accounted for a much higher proportion of the population than they do today — but signs of Ice Age kids are hard to uncover. Their small, fragile bones are less likely to be found. And our assumption that they don't contribute much to society often pushes them out of the picture, argues archaeologist and anthropologist April Nowellis. She traces the evidence that is reshaping our understanding of Palaeolithic children, from tiny footprints preserved in mud to the lines made by little fingers in iconic cave paintings.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=41621dc71d&e=1db4b9a19b>

NATURE BRIEFING – ‘Mirror neurons’ fire in mouse brawls

A type of brain cell that is crucial for triggering fights is also activated in mice when they watch other mice fight. The findings suggest that these ‘mirror neurons’ “are actually able to sense or respond to another animal’s social experience”, says social neuroscientist Dayu Lin. Because these cells fire both when an animal observes a behaviour and when it performs that behaviour, some scientists have argued that they might be involved in complex social functions, such as empathy.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=9c1b3ba868&e=1db4b9a19b>

SCIENCE NEWS – Watch this genius bird plan for its ‘handyman’ job

Goffin’s cockatoos take a tool set to work on a puzzle box, a rare example of pre-planning in the animal kingdom.

<https://www.science.org/content/article/watch-genius-bird-plan-its-handyman-job>

SCIENCE NEWS – Hidden Hydrogen

Does Earth hold vast stores of a renewable, carbon-free fuel?

{Not our usual fare, but something optimistic for February.}

<https://www.science.org/content/article/hidden-hydrogen-earth-may-hold-vast-stores-renewable-carbon-free-fuel>

SOCIETY FOR SCIENCE – Cockatoos can tell when they need more than one tool to swipe a snack

Cockatoos know when it will take a stick and a straw to nab a nut in a puzzle box. The birds join chimps as the only known nonhumans to use a tool kit.

<http://click.societyforscience->

[email.com/?qs=d8fed27f1318fcb563e7faff719b8323a7410d8e0add274f0e5d8a4157e3292d31ebdaa76f5c7dbb1f54c8d4e48f608a6d5e2314fc3d08dca7da3041afaaa2f0](http://click.societyforscience-email.com/?qs=d8fed27f1318fcb563e7faff719b8323a7410d8e0add274f0e5d8a4157e3292d31ebdaa76f5c7dbb1f54c8d4e48f608a6d5e2314fc3d08dca7da3041afaaa2f0)

SOCIETY FOR SCIENCE – Hominids used stone tool kits to butcher animals earlier than once thought

Finds in Kenya push Oldowan tool use back to around 2.9 million years ago, roughly 300,000 years earlier than previous evidence.

<http://click.societyforscience->

[email.com/?qs=d8fed27f1318fcb5d6f866da5ea8751688999ed25c4d21d34dbc88431a092ca992a5ac3e547347fbf869190ea635f6630bf67cb11cb19c9816b322b046051a07](http://click.societyforscience-email.com/?qs=d8fed27f1318fcb5d6f866da5ea8751688999ed25c4d21d34dbc88431a092ca992a5ac3e547347fbf869190ea635f6630bf67cb11cb19c9816b322b046051a07)

SOCIETY FOR SCIENCE – Orca moms baby their adult sons. That favoritism pays off — eventually

By sharing fish with their adult sons, orca moms may skimp on nutrition, cutting their chances of more offspring but boosting the odds for grandwhales.

<http://click.societyforscience->

[email.com/?qs=d8fed27f1318fcb55f26bc34b6a15f6c101f01e29b700b718549fbbc59df66eb982dddb4e816b8e4d2a4fa1d5d116c48cb25476d7ef60715aa8605908881c1be](http://click.societyforscience-email.com/?qs=d8fed27f1318fcb55f26bc34b6a15f6c101f01e29b700b718549fbbc59df66eb982dddb4e816b8e4d2a4fa1d5d116c48cb25476d7ef60715aa8605908881c1be)

PUBLICATIONS

Animal Behaviour

PAPERS

DOROTHY MUNKENBECK FRAGASZY et al with ELISABETTA VISALBERGHI – The development of expertise at cracking palm nuts by wild bearded capuchin monkeys, *Sapajus libidinosus*

Bearded capuchin monkeys at Fazenda Boa Vista, Piauí, Brazil older than 8 years routinely crack palm nuts with a stone hammer and anvil. An embodied, perception–action stance hypothesizes that monkeys' improving skill at this task is enabled by learning affordances of spatial and force relations produced with objects. Affordances are individual-relative opportunities for action that may change across development. We evaluated predictions linking behaviours with nuts and stones and body mass to success at nut cracking in young bearded capuchins (1.3–6.3 years old) and adults over three annual observation periods. Behaviours with nuts and stones reflected the monkeys' learning affordances for cracking; body mass constrained affordances for cracking. For each period in which they were observed, individuals were assigned to novice, intermediate or expert classes in accord with their success at cracking nuts. Novices did not crack nuts, despite striking them with stones. Body mass was modestly associated with intermediates', but not experts', likelihood of cracking a nut. Experts exhibited higher proportions of manipulation devoted to positioning nuts on the anvil and shorter bouts of cracking than intermediates; intermediates exhibited greater variability in these variables than experts or novices. The strongest classification model predicting individuals' assignments to skill class with 89% accuracy combined average bout duration and the ratio of manipulation devoted to positioning to other manipulation. The findings suggest practise using the body-pus-tool system for cracking palm nuts supports affordance learning and results in gradual mastery of this skill and that changing body mass plays a small role in this process.

eLife

PAPERS

JIE HU, ARKADY KONOVALOV & CHRISTIAN C RUFF – A unified neural account of contextual and individual differences in altruism

Altruism is critical for cooperation and productivity in human societies but is known to vary strongly across contexts and individuals. The origin of these differences is largely unknown, but may in principle reflect variations in different neurocognitive processes that temporally unfold during altruistic decision making (ranging from initial perceptual processing via value computations to final integrative choice mechanisms). Here, we elucidate the neural origins of individual and contextual differences in altruism by examining altruistic choices in different inequality contexts with computational modeling and electroencephalography (EEG). Our results show that across all contexts and individuals, wealth distribution choices recruit a similar late decision process evident in model-predicted evidence accumulation signals over parietal regions. Contextual and individual differences in behavior related instead to initial processing of stimulus-locked inequality-related value information in centroparietal and centrofrontal sensors, as well as to gamma-band synchronization of these value-related signals with parietal response-locked evidence-accumulation signals. Our findings suggest separable biological bases for individual and contextual differences in altruism that relate to differences in the initial processing of choice-relevant information.

<https://elifesciences.org/articles/80667>

NADESCHA TRUDEL et al – Neural activity tracking identity and confidence in social information

Humans learn about the environment either directly by interacting with it or indirectly by seeking information about it from social sources such as conspecifics. The degree of confidence in the information obtained through either route should determine the impact that it has on adapting and changing behaviour. We examined whether and how behavioural and neural computations differ during non-social learning as opposed to learning from social sources. Trial-wise confidence judgements about non-social and social information sources offered a window into this learning process. Despite matching exactly the statistical features of social and non-social conditions, confidence judgements were more accurate and less changeable when they were made about social as opposed to non-social information sources. In addition to subjective reports of confidence, differences were also apparent in the Bayesian estimates of participants' subjective beliefs. Univariate activity in dorsomedial prefrontal cortex and posterior temporoparietal junction more closely tracked confidence about social as opposed to non-social information sources. In addition, the multivariate patterns of activity in the same areas encoded identities of social information sources compared to non-social information sources.

<https://elifesciences.org/articles/71315>

Evolutionary Anthropology

PAPERS

ALASTAIR KEY & NICK ASHTON – Hominins likely occupied northern Europe before one million years ago

Our understanding of when hominins first reached northern Europe is dependent on a fragmented archaeological and fossil record known from as early as marine isotope stage (MIS) 21 or 25 (c. 840 or 950 thousand years ago [Ka]). This contrasts sharply with southern Europe, where hominin occupation is evidenced from MIS 37 to 45 (c. 1.22 or 1.39 million years ago [Ma]). Northern Europe, however, exhibits climatic, geological, demographic, and historical disadvantages when it comes to preserving fossil and archaeological evidence of early hominin habitation. It is argued here that perceived differences in first occupation timings between the two European regions needs to be revised in light of these factors. To enhance this understanding, optimal linear estimation models are run using data from the current fossil and artefact record. Results suggest northern Europe to have first been occupied as early as 1.16 Ma, or as late as 913 Ka. These timings could represent minimum date expectations and be extended through future archaeological and fossil discoveries.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21966>

NATHALIE GONTIER & ANTON SUKHOVERKHOV – Reticulate evolution underlies synergistic trait formation in human communities

This paper investigates how reticulate evolution contributes to a better understanding of human sociocultural evolution in general, and community formation in particular. Reticulate evolution is evolution as it occurs by means of symbiosis, symbiogenesis, lateral gene transfer, infective heredity, and hybridization. From these mechanisms and processes, we mainly zoom in on symbiosis and we investigate how it underlies the rise of (1) human, plant, animal, and machine interactions typical of agriculture, animal husbandry, farming, and industrialization; (2) diet-microbiome relationships; and (3) host-virome and other pathogen interactions that underlie human health and disease. We demonstrate that reticulate evolution necessitates an understanding of behavioral and cultural evolution at a community level, where reticulate causal processes underlie the rise of synergistic organizational traits.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.21962>

KEVIN G. HATALA, NEIL T. ROACH & ANNA K. BEHRENSMEYER – Fossil footprints and what they mean for hominin paleobiology

Hominin footprints have not traditionally played prominent roles in paleoanthropological studies, aside from the famous 3.66 Ma footprints discovered at Laetoli, Tanzania in the late 1970s. This contrasts with the importance of trace fossils (ichnology) in the broader field of paleontology. Lack of attention to hominin footprints can probably be explained by perceptions that these are exceptionally rare and “curiosities” rather than sources of data that yield insights on par with skeletal fossils or artifacts. In recent years, however, discoveries of hominin footprints have surged in frequency, shining important new light on anatomy, locomotion, behaviors, and environments from a wide variety of times and places. Here, we discuss why these data are often overlooked and consider whether they are as “rare” as previously assumed. We review new ways footprint data are being used to address questions about hominin paleobiology, and we outline key opportunities for future research in hominin ichnology.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21963>

REVIEWS**KEVIN D. HUNT – Critical theory, evolutionary theory, and testosterone**

Review of ‘Testosterone: An unauthorized biography’ by Jordan-Young, R.M. & Karkazis, K. (2019) Harvard University Press; and

Review of ‘T: The story of testosterone, the hormone that dominates and divides us’ by Hooven, C. (2021) Henry Holt.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21960>

Heliyon**PAPERS****BADR MOHAMMED ALBARAM & YET MEE LIM – Conceptualization social influence from the need to belong perspective on psychological needs' satisfaction to share knowledge**

Aiming to comprehend the function of social influence as an extrinsic motive influencing individuals' psychological needs satisfaction to share knowledge in higher educational institutions, the study will profile prior literature on how social influence affects knowledge sharing and conceptualize a suggested framework.

The research thoroughly examined the literature for the previous ten years using a comprehensive evaluation, mapping and analyzes research networks of the literature on relational social influence factors through bibliometric analysis. It offers a conceptual framework that explains extrinsic social factors and their effects on the psychological needs satisfaction to share knowledge among people from the viewpoint of a need to belong.

[https://www.cell.com/heliyon/fulltext/S2405-8440\(23\)00971-4](https://www.cell.com/heliyon/fulltext/S2405-8440(23)00971-4)

IMMUNITY**PAPERS****MARTIN CORCORAN et al – Archaic humans have contributed to large-scale variation in modern human T cell receptor genes**

Human T cell receptors (TCRs) are critical for mediating immune responses to pathogens and tumors and regulating self-antigen recognition. Yet, variations in the genes encoding TCRs remain insufficiently defined. Detailed analysis of expressed TCR alpha, beta, gamma, and delta genes in 45 donors from four human populations—African, East Asian, South Asian, and European—revealed 175 additional TCR variable and junctional alleles. Most of these contained coding changes and were present at widely differing frequencies in the populations, a finding confirmed using DNA samples from the 1000 Genomes Project. Importantly, we identified three Neanderthal-derived, introgressed TCR regions including a highly divergent TRGV4 variant, which mediated altered butyrophilin-like molecule 3 (BTNL3) ligand reactivity and was frequent in all modern Eurasian population groups. Our results demonstrate remarkable variation in TCR genes in both individuals and populations, providing a strong incentive for including allelic variation in studies of TCR function in human biology.

[https://www.cell.com/immunity/fulltext/S1074-7613\(23\)00038-9](https://www.cell.com/immunity/fulltext/S1074-7613(23)00038-9)

Nature**NEWS****‘Mirror neurons’ fire up during mouse battles**

Brain cells are crucial for triggering fights — but also become active when mice merely observe fights.

<https://www.nature.com/articles/d41586-023-00418-1>

ARTICLES**LUKE M. EVANS & PAMELA N. ROMERO VILLELA – How rare mutations contribute to complex traits**

An analysis of rare genetic variants reveals that they influence human traits through similar biological pathways to common ones. The work deepens our understanding of how this type of variant affects complex traits.

<https://www.nature.com/articles/d41586-023-00272-1>

Nature Africa

PAPERS

GILBERT NAKWEYA – Tool technology older than previously thought

New findings shed light on ancient dietary habits.

<https://www.nature.com/articles/d44148-023-00049-8>

Nature Reviews Neuroscience

PAPERS

PIERRE VANDERHAEGHEN & FRANCK POLLEUX – Developmental mechanisms underlying the evolution of human cortical circuits

The brain of modern humans has evolved remarkable computational abilities that enable higher cognitive functions. These capacities are tightly linked to an increase in the size and connectivity of the cerebral cortex, which is thought to have resulted from evolutionary changes in the mechanisms of cortical development. Convergent progress in evolutionary genomics, developmental biology and neuroscience has recently enabled the identification of genomic changes that act as human-specific modifiers of cortical development. These modifiers influence most aspects of corticogenesis, from the timing and complexity of cortical neurogenesis to synaptogenesis and the assembly of cortical circuits. Mutations of human-specific genetic modifiers of corticogenesis have started to be linked to neurodevelopmental disorders, providing evidence for their physiological relevance and suggesting potential relationships between the evolution of the human brain and its sensitivity to specific diseases.

<https://www.nature.com/articles/s41583-023-00675-z>

Nature Scientific Reports

PAPERS

ERIN ELISABETH HECHT et al with DIETRICH STOUT – Neuroplasticity enables bio-cultural feedback in Paleolithic stone-tool making

Stone-tool making is an ancient human skill thought to have played a key role in the bio-cultural co-evolutionary feedback that produced modern brains, culture, and cognition. To test the proposed evolutionary mechanisms underpinning this hypothesis we studied stone-tool making skill learning in modern participants and examined interactions between individual neurostructural differences, plastic accommodation, and culturally transmitted behavior. We found that prior experience with other culturally transmitted craft skills increased both initial stone tool-making performance and subsequent neuroplastic training effects in a frontoparietal white matter pathway associated with action control. These effects were mediated by the effect of experience on pre-training variation in a frontotemporal pathway supporting action semantic representation. Our results show that the acquisition of one technical skill can produce structural brain changes conducive to the discovery and acquisition of additional skills, providing empirical evidence for bio-cultural feedback loops long hypothesized to link learning and adaptive change.

<https://www.nature.com/articles/s41598-023-29994-y>

JOSEPH ROVETTI, DAVID SUMANTRY & FRANK A. RUSSO – Exposure to nonnative-accented speech reduces listening effort and improves social judgments of the speaker

Prior research has revealed a native-accent advantage, whereby nonnative-accented speech is more difficult to process than native-accented speech. Nonnative-accented speakers also experience more negative social judgments. In the current study, we asked three questions. First, does exposure to nonnative-accented speech increase speech intelligibility or decrease listening effort, thereby narrowing the native-accent advantage? Second, does lower intelligibility or higher listening effort contribute to listeners' negative social judgments of speakers? Third and finally, does increased intelligibility or decreased listening effort with exposure to speech bring about more positive social judgments of speakers? To address these questions, normal-hearing adults listened to a block of English sentences with a native accent and a block with nonnative accent. We found that once participants were accustomed to the task, intelligibility was greater for nonnative-accented speech and increased similarly with exposure for both accents. However, listening effort decreased only for nonnative-accented speech, soon reaching the level of native-accented speech. In addition, lower intelligibility and higher listening effort was associated with lower ratings of speaker warmth, speaker competence, and willingness to interact with the speaker. Finally, competence ratings increased over time to a similar extent for both accents, with this relationship fully mediated by intelligibility and listening effort. These results offer insight into how listeners process and judge unfamiliar speakers.

<https://www.nature.com/articles/s41598-023-29082-1>

SETHU KARTHIKEYAN et al – Articulatory effects on perceptions of men’s status and attractiveness

Research on heterosexual mating has demonstrated that acoustic parameters (e.g., pitch) of men’s voices influence their attractiveness to women and appearance of status and formidability to other men. However, little is known about how men’s tendency to clearly articulate their speech influences these important social perceptions. In the current study, we used a repeated-measures design to investigate how men’s articulatory clarity or conformity influenced women’s (N = 45) evaluations of men’s attractiveness for both short- and long-term relationships, and men’s (N = 46) evaluations of physical formidability and prestige. Results largely supported our hypotheses: men who enunciated phonemes more distinctly were more attractive to women for long-term relationships than short-term relationships and were perceived by other men to have higher prestige than physical dominance. These findings suggest that aspects of articulatory behavior that influence perceptions of prestige and long-term mating attractiveness may indicate an early social history characterized by high socioeconomic status, likely owing to crystallization of articulatory patterns during the critical period of language development. These articulatory patterns may also be honest signals of condition or disposition owing to the nature of complex, multicomponent traits, which deserve further empirical attention.

<https://www.nature.com/articles/s41598-023-29173-z>

TIANYOU HE et al – Quantifying the retention of emotions across story retellings

Story retelling is a fundamental medium for the transmission of information between individuals and among social groups. Besides conveying factual information, stories also contain affective information. Though natural language processing techniques have advanced considerably in recent years, the extent to which machines can be trained to identify and track emotions across retellings is unknown. This study leverages the powerful RoBERTa model, based on a transformer architecture, to derive emotion-rich story embeddings from a unique dataset of 25,728 story retellings. The initial stories were centered around five emotional events (joy, sadness, embarrassment, risk, and disgust—though the stories did not contain these emotion words) and three intensities (high, medium, and low). Our results indicate (1) that RoBERTa can identify emotions in stories it was not trained on, (2) that the five emotions and their intensities are preserved when they are transmitted in the form of retellings, (3) that the emotions in stories are increasingly well-preserved as they experience additional retellings, and (4) that among the five emotions, risk and disgust are least well-preserved, compared with joy, sadness, and embarrassment. This work is a first step toward quantifying situation-driven emotions with machines.

<https://www.nature.com/articles/s41598-023-29178-8>

New Scientist**NEWS****Early risers may have inherited faster body clocks from Neanderthals**

Many of us carry the genetic inheritance of our ancestors’ interbreeding with Neanderthals or Denisovans in our blood. Only now are we working out what that means for us.

<https://www.newscientist.com/article/2359553-early-risers-may-have-inherited-faster-body-clocks-from-neanderthals/>

PeerJ**PAPERS****LUIGI BACIADONNA – Mirror stimulation in Eurasian jays (*Garrulus glandarius*)**

Mirror exposure elicits a wide range of behavioral responses, some of which have been considered as part of possible evidence of mirror self-recognition (MSR). These responses can range from social behaviors, indicating that an animal considers its own reflection as a conspecific, to mirror-guided and self-directed actions. Evidence of MSR has been found categorically in only a few species, such as in magpies, chimpanzees, horses, and elephants. Evidence in corvids is currently debated due to inconsistent findings. In this study, we investigated the reaction of Eurasian jays when presenting them with three mirror-stimulation tasks. Based on the overall behavioral patterns across these three tasks, conclusions about birds’ understanding of a reflective surface, and their perception of the reflection as either themselves or as a conspecific, appear premature. We highlight how the high neophobia of corvids and other methodological constraints might have hindered the likelihood to approach and explore a mirror, preventing the emergence of behaviors typically associated with MSR. Furthermore, we discuss how motivational factors, methodological constraints and species differences should be considered when interpreting behavioral responses to mirrors.

<https://peerj.com/articles/14729/>

PLoS One**PAPERS****SAHRA TALAMO et al – Back to the future: The advantage of studying key events in human evolution using a new high resolution radiocarbon method**

Radiocarbon dating is the most widely applied dating method in archaeology, especially in human evolution studies, where it is used to determine the chronology of key events, such as the replacement of Neanderthals by modern humans in Europe. However, the method does not always provide precise and accurate enough ages to understand the important processes of

human evolution. Here we review the newest method developments in radiocarbon dating ('Radiocarbon 3.0'), which can lead us to much better chronologies and understanding of the major events in recent human evolution. As an example, we apply these new methods to discuss the dating of the important Palaeolithic site of Bacho Kiro (Bulgaria).

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0280598>

PNAS

PAPERS

MARK F. TEAFORD, PETER S. UNGAR & FREDERICK E. GRINE – Changing perspectives on early hominin diets

It is axiomatic that knowledge of the diets of extinct hominin species is central to any understanding of their ecology and our evolution. The importance of diet in the paleontological realm has led to the employment of multiple approaches in its elucidation. Some of these have deep historical roots, while others are dependent upon more recent technical and methodological advances. Historically, studies of tooth size, shape, and structure have been the gold standard for reconstructing diet. They focus on species-level adaptations, and as such, they can set theoretical brackets for dietary capabilities within the context of specific evolutionary moments. Other methods (e.g., analyses of dental calculus, biogeochemistry, and dental microwear) have only been developed within the past few decades, but are now beginning to yield evidence of the actual foods consumed by individuals represented by fossil remains. Here we begin by looking at these more "direct" forms of evidence of diet before showing that, when used in conjunction with other techniques, these "multi-proxy" approaches can raise questions about traditional interpretations of early hominin diets and change the nature of paleobiological interpretations.

<https://www.pnas.org/doi/abs/10.1073/pnas.2201421120>

COMMENTARIES

PAUL R.B. KOZOWYK – Archaeological Podocarpus tar supports the cognitive complexity of Neanderthals

No summary provided.

<https://www.pnas.org/doi/abs/10.1073/pnas.2221676120>

PATRICK SCHMIDT, TABEA J. KOCH & CLAUDIO TENNIE – Reply to Paul R.B. Kozowyk: Interpreting the complexity of archaeological adhesives may lead to misconceptions about early humans

Kozowyk proposes an alternative interpretation of a study on Neanderthal birch tar making. He compares findings from 2019 that birch tar can be made with a simple aboveground method—the then unknown condensation method—with more recent results on Podocarpus tar making in the African Middle Stone Age (MSA). He argues that if Podocarpus tar making can yield information about ancient cognition, birch tar making can, too. We agree with this. However, the rationale behind Kozowyk's proposition is based on two misconceptions, highlighting that complexity interpretations remain problematic.

<https://www.pnas.org/doi/full/10.1073/pnas.2300325120>

Proceedings of the Royal Society B

PAPERS

MAYTE MARTÍNEZ et al with SARAH F. BROSANAN – Dogs take into account the actions of a human partner in a cooperative task

Humans stand out for their capacity to flexibly cooperate, possibly because they understand their partners' role. Researchers have explored if such understanding is unique to humans by assessing whether non-human species wait to manipulate a cooperative apparatus until a delayed partner arrives. If animals do wait, then it is assumed that they recognize the need for a partner. However, success in these tasks may be the result of social facilitation, while failure may be due to poor inhibitory control. Moreover, this approach does not test if animals take their partners' actions into account. Here we trained dogs to press a button simultaneously with their human partner. Afterwards, we tested them in several conditions to disentangle which elements of their partner's behaviour they take into account. Dogs waited to press the button until the delayed partner arrived, the button was available to the partner and the partner acted (pressed the button). We found no relationship between inhibitory control and success. We conclude that dogs are not merely reacting to the presence of their human partners, but are also taking their actions into account when coordinating with them.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2022.2189>

Royal Society Open Science

PAPERS

JAMES N. KIRBY et al – Testing the bounds of compassion in young children

Extensive research shows that, under the right circumstances, children are highly prosocial. Extending an already published paradigm, we aimed here to determine what factors might facilitate and inhibit compassionate behaviour. Across five experiments (N = 285), we provide new insight into the bounds of 4- to 5-year-old children's compassionate behaviour. In the first three experiments, we varied cost of compassion by changing the reward (Study 1), using explicit instructions (Study 2) and ownership (Study 3). In the final two experiments, we varied the target of the compassionate behaviour, examining

adults compared with puppet targets (Study 4), and whether the target was an in-group member (Study 5). We found strong evidence that cost reduces compassionate responding. By contrast, the recipient of compassion did not appear to influence responding: children were equally likely to help a human adult and a puppet, and an in-group member and neutral agent. These findings demonstrate that for young children, personal cost appears to be a greater inhibitor to compassionate responding than who compassion is directed toward.

<https://royalsocietypublishing.org/doi/10.1098/rsos.221448>

Science Advances

PAPERS

JÖRG GROSS et al – The evolution of universal cooperation

Humans work together in groups to tackle shared problems and contribute to local club goods that benefit other group members. Whereas benefits from club goods remain group bound, groups are often nested in overarching collectives that face shared problems like pandemics or climate change. Such challenges require individuals to cooperate across group boundaries, raising the question how cooperation can transcend beyond confined groups. Here, we show how frequent intergroup interactions allow groups to transition from group-bound to universal cooperation. With frequent intergroup interactions, reciprocity of cooperative acts permeates group boundaries and enables the evolution of universal cooperation. As soon as intergroup interactions take place frequently, people start to selectively reward cooperation aimed at benefitting everyone, irrespective of their group membership. Simulations further show that it becomes more difficult to overcome group-bound cooperation when populations are fragmented into many small groups. Our findings reveal important prerequisites for the evolution of universal cooperation.

<https://www.science.org/doi/full/10.1126/sciadv.add8289>

EDWIN J. C. VAN LEEUWEN & WILLIAM HOPPITT – Biased cultural transmission of a social custom in chimpanzees

Cultural transmission studies in animals have predominantly focused on identifying between-group variation in tool-use techniques, while immaterial cultures remain understudied despite their potential for highlighting similarities between human and animal culture. Here, using long-term data from two chimpanzee communities, we tested whether one of chimpanzees' most enigmatic social customs—the grooming handclasp—is culturally transmitted by investigating the influence of well-documented human transmission biases on their variational preferences. After identifying differences in style preferences between the communities, we show that older and dominant individuals exert more influence over their partners' handclasp styles. Mothers were equally likely to influence their offspring's preferences as nonkin, indicating that styles are transmitted both vertically and obliquely. Last, individuals gradually converged on the group style, suggesting that conformity guides chimpanzees' handclasp preferences. Our findings show that chimpanzees' social lives are influenced by cultural transmission biases that hitherto were thought to be uniquely human.

<https://www.science.org/doi/full/10.1126/sciadv.ade5675>

Trends in Cognitive Sciences

PAPERS

MITSUHIKO ISHIKAWA & ATSUSHI SENJU – Action value calculations in social context from infancy

Infants adaptively modulate their social behaviours, such as gaze-following, to social context. We propose that such modulations are based on infants' social decision-making, to achieve the most valuable outcome. We propose an 'action value calculator model', which formulates the cognitive mechanisms underlying, and the development of, the decision-making process during interactions.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00322-9](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00322-9)

MARK S. BLUMBERG & KAREN E. ADOLPH – Protracted development of motor cortex constrains rich interpretations of infant cognition

Cognition in preverbal human infants must be inferred from overt motor behaviors such as gaze shifts, head turns, or reaching for objects. However, infant mammals – including human infants – show protracted postnatal development of cortical motor outflow. Cortical control of eye, face, head, and limb movements is absent at birth and slowly emerges over the first postnatal year and beyond. Accordingly, the neonatal cortex in humans cannot generate the motor behaviors routinely used to support inferences about infants' cognitive abilities, and thus claims of developmental continuity between infant and adult cognition are suspect. Recognition of the protracted development of motor cortex should temper rich interpretations of infant cognition and motivate more serious consideration of the role of subcortical mechanisms in early cognitive development.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00331-X](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00331-X)

SASKIA L. FRISBY et al – Decoding semantic representations in mind and brain

A key goal for cognitive neuroscience is to understand the neurocognitive systems that support semantic memory. Recent multivariate analyses of neuroimaging data have contributed greatly to this effort, but the rapid development of these novel

approaches has made it difficult to track the diversity of findings and to understand how and why they sometimes lead to contradictory conclusions. We address this challenge by reviewing cognitive theories of semantic representation and their neural instantiation. We then consider contemporary approaches to neural decoding and assess which types of representation each can possibly detect. The analysis suggests why the results are heterogeneous and identifies crucial links between cognitive theory, data collection, and analysis that can help to better connect neuroimaging to mechanistic theories of semantic cognition.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00323-0](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00323-0)

KENTARO MIYAMOTO, MATTHEW F.S. RUSHWORTH & NICHOLAS SHEA – Imagining the future self through thought experiments

The ability of the mind to conceptualize what is not present is essential. It allows us to reason counterfactually about what might have happened had events unfolded differently or had another course of action been taken. It allows us to think about what might happen – to perform 'Gedankenexperimente' (thought experiments) – before we act. However, the cognitive and neural mechanisms mediating this ability are poorly understood. We suggest that the frontopolar cortex (FPC) keeps track of and evaluates alternative choices (what we might have done), whereas the anterior lateral prefrontal cortex (alPFC) compares simulations of possible future scenarios (what we might do) and evaluates their reward values. Together, these brain regions support the construction of suppositional scenarios.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00023-2](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00023-2)

COMMENTARIES

BEATRICE DE GELDER – Social affordances, mirror neurons, and how to understand the social brain

Gibson's notion of affordances refers to the opportunities for action that the environment offers, and that the organism can act upon. A good decade later, the discovery of mirror neurons (MNs) in rhesus macaques demonstrated that motor sequences are best viewed as actions (grasping) because they are organized by high-level goals (e.g., eating food) rather than by the physics of the effectors. The notion of affordance may resonate with MN researchers because it fits the idea that movements are organized as ensembles best defined by the agents' intention rather than by agent-independent physical properties. Recently, Bonini et al. [EAORC Bulletin 1,022] extended MN research on instrumental actions in the physical world to social interactions and linked MNs to a social affordance framework, placing the perception of conspecifics ('others') at the center. MNs and social affordance theory have been criticized for lack of clarity: does combining them promise a step forward in understanding the social brain?

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00296-0](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00296-0)

LUCA BONINI et al – The mirror mechanism: linking perception and social interaction

We thank Beatrice de Gelder for the opportunity to clarify some important points about our recent article in TiCs on the trends in mirror neuron research 30 years after their first description. The mainstream view of the mirror mechanism classically focused on agent-shared representations as a ground for social perception. Based on evidence accumulated over the past few years, even outside the mirror neuron literature, we proposed a new framework that marks a departure from the traditional view in three main ways. First, individual 'mirror' neurons do not constitute the unique core of the mechanism, which is locally distributed among a variety of cell types, encompassing inhibitory interneurons and corticostriatal neurons, in addition to corticospinal neurons; second, the mirror mechanism relies on a network of brain regions, linking areas primarily involved in perceptual processes with motor and visceromotor brain structures; and third, although having a well-established role in high-order perceptual functions, such as speech perception in humans, a hallmark function of the mirror mechanisms, which is phylogenetically preserved across vertebrate species, appears to be related to social interaction rather than social perception. We are pleased to address the three questions raised by de Gelder aimed at guiding future progress in social brain research, but we also take this occasion to clarify three misunderstandings we believe can be inferred from her reading of our perspective.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00327-8](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00327-8)

Trends in Ecology and Evolution

PAPERS

LEE HSIANG LIOW, JOSEF UYEDA & GENE HUNT – Cross-disciplinary information for understanding macroevolution

Many different macroevolutionary models can produce the same observations. Despite efforts in building more complex and realistic models, it may still be difficult to distinguish the processes that have generated the biodiversity we observe. In this opinion we argue that we can make new progress by reaching out across disciplines, relying on independent data and theory to constrain macroevolutionary inference. Using mainly paleontological insights and data, we illustrate how we can eliminate less plausible or implausible models, and/or parts of parameter space, while applying comparative phylogenetic approaches. We emphasize that such cross-disciplinary insights and data can be drawn between many other disciplines relevant to macroevolution. We urge cross-disciplinary training, and collaboration using common-use databases as a platform for increasing our understanding.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(22\)00280-4](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(22)00280-4)

COMMENTARIES

ARY A. HOFFMANN & JON BRIDLE – Plasticity and the costs of incorrect responses

Vinton et al. [EAORC Bulletin 1,006] raise important issues in understanding plastic responses to climate change, by focusing on whether existing genotypic sensitivities increase or decrease rates of evolutionary response, depending on local environmental variability and the autocorrelation between environmental states. Their perspective emphasises interactions between environmental variability and predictability when assessing the likelihood and magnitude of evolution under climate change. We point to a framework for further understanding these interactions.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(22\)00292-0](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(22)00292-0)

ANNA C. VINTON & SAMUEL J.L. GASCOIGNE – The importance of spatial and temporal structure in determining the interplay between plasticity and evolution

Hoffmann and Bridle describe two processes that the framework introduced by Vinton et al. did not explicitly consider. These two processes, reversibility of plastic responses and time lags in sensitivity of responses to the environment, can affect how plasticity impacts evolution. These processes are easily incorporated into our framework by adding stage structure and lagged environmental drivers. In Vinton et al., when discussing the costs of plasticity, we primarily focused on energetic impacts on fitness, and the role of environmental predictability. Hoffmann and Bridle are correct that differential impacts of plasticity across an individual's lifetime might determine its response to different types of environmental change.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(22\)00335-4](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(22)00335-4)

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