

## EAORC BULLETIN 1,060 – 8 October 2023

## CONTENTS

<b>NOTICES</b> .....	<b>3</b>
PUBLICATION ALERTS.....	3
EDITORIAL INTERJECTIONS.....	3
ACADEMIA.EDU – Language presupposes an enchronic infrastructure for social interaction.....	3
N.J. ENFIELD & JACK SIDNELL – Language presupposes an enchronic infrastructure for social interaction.....	3
ACADEMIA.EDU – Archaeology, Evolution and Darwinism.....	3
ALEKSANDAR PALAVESTRA & MARKO PORČIĆ – Archaeology, Evolution and Darwinism.....	3
ACADEMIA.EDU – How sapiens became behaviourally modern.....	3
KIM STERELNY – From hominins to humans: how sapiens became behaviourally modern.....	3
CONFERENCE ALERT – Perspectives on Speciation: Linnean Society of London, 11 April 2024.....	4
<b>NEWS</b> .....	<b>4</b>
SAPIENS – Chimpanzees Can’t Tell Us Much About Being Human.....	4
THE CONVERSATION – Consciousness: why a leading theory has been branded ‘pseudoscience’.....	4
THE CONVERSATION – Female animals teach each other to choose unusual males – new research.....	4
THE CONVERSATION – Humans got to America 7,000 years earlier than thought, new research confirms.....	4
OTHER NEWS – INDEPENDENT – Scientific breakthrough confirms how early man left Africa 84,000ya.....	4
OTHER NEWS – KNOWABLE MAGAZINE – Division of labor in ants, wasps, bees — and us.....	4
<b>PUBLICATIONS</b> .....	<b>4</b>
American Journal of Biological Anthropology.....	4
<b>PAPERS</b> .....	4
JIAMING HUI & ANTOINE BALZEAU – The diploic venous system in Homo neanderthalensis and fossil Homo sapiens: A study using high-resolution computed tomography.....	4
<b>REVIEWS</b> .....	5
SHARON M. YOUNG – Changing tides.....	5
ZACHARY THROCKMORTON – Pettitt’s popular paleoanthropology book is engaging and accessible.....	5
Current Biology.....	5
<b>PAPERS</b> .....	5
JANA TEGELBECKERS et al – Lateral orbitofrontal cortex integrates predictive information across multiple cues to guide behavior.....	5
eLife.....	5
<b>PAPERS</b> .....	5
ANJA T. ZAI et al – Goal-directed vocal planning in a songbird.....	5
ALAN V. RINCON et al – Higher social tolerance is associated with more complex facial behavior in macaques.....	5
Frontiers in Mammal Science.....	6
<b>PAPERS</b> .....	6
ZDRAVKO PETANJEK et al – Von Economo neurons as a specialized neuron class of the human cerebral cortex.....	6
Human Nature.....	6
<b>PAPERS</b> .....	6
CODY MOSER et al – Aggressive Mimicry and the Evolution of the Human Cognitive Niche.....	6
PAOLA CERRITO & JUDITH M. BURKART – Human Amygdala Volumetric Patterns Convergently Evolved in Cooperatively Breeding and Domesticated Species.....	6
Nature.....	6
<b>PAPERS</b> .....	6
ABHISHEK SHARMA et al – Assembly theory explains and quantifies selection and evolution.....	6
<b>REVIEWS</b> .....	7
JOSIE GLAUSIUSZ – A ‘user’s manual for the female mammal’ — how women’s bodies evolved.....	7
Nature Communications.....	7
<b>PAPERS</b> .....	7
MASAKAZU AGETSUMA et al – Activity-dependent organization of prefrontal hub-networks for associative learning and signal transformation.....	7
JOSÉ M. GÓMEZ, A. GÓNZALEZ-MEGÍAS & M. VERDÚ – The evolution of same-sex sexual behaviour in mammals.....	7
ZSUZSANNA KOCSIS et al – Immediate neural impact and incomplete compensation after semantic hub disconnection.....	7
Nature Humanities & Social Sciences Communications.....	8
<b>PAPERS</b> .....	8

Nature Mental Health .....	8
<b>PAPERS</b> .....	8
RACHEL G. ZSIDO et al – Ultra-high-field 7T MRI reveals changes in human medial temporal lobe volume in female adults during menstrual cycle .....	8
Nature Reviews Neuroscience.....	8
<b>PAPERS</b> .....	8
ILANA HARRIS et al – Is song processing distinct and special in the auditory cortex?.....	8
Nature Scientific Reports.....	8
<b>PAPERS</b> .....	8
CAMILLE LACROUX et al – Chimpanzees select comfortable nesting tree species.....	8
ANTONIO ARNAIZ-VILLENNA et al – Major histocompatibility complex component (MHC) Bf alleles show trans species evolution between man and chimpanzee .....	9
MASAKI SHIMADA & WATARU YANO – Behavioral responses of wild chimpanzees toward a juvenile that suddenly lost its animacy due to a fall accident .....	9
BALARAJU BATTU – Co-evolution of conditional cooperation and social norm .....	9
Neuron.....	10
<b>PAPERS</b> .....	10
MAURICIO R. DELGADO, DOMINIC S. FARERI & LUKE J. CHANG – Characterizing the mechanisms of social connection .....	10
Philosophical Transactions of the Royal Society B .....	10
<b>CORRECTIONS</b> .....	10
SVEN GRAWUNDER et al with ROMAN M. WITTIG & CATHERINE CROCKFORD – Correction: ‘Chimpanzee vowel-like sounds and voice quality suggest formant space expansion through the hominoid lineage’ (2021), by Grawunder et al. ....	10
PLoS One.....	10
<b>PAPERS</b> .....	10
MARIA MARTZOUKOU, DIMITRIOS PAPADOPOULOS & MARY H. KOSMIDIS – Syntactic and affective prosody recognition: Schizophrenia vs. Autism spectrum disorders .....	10
JAVIER ARAGONCILLO-DEL RÍO et al – Human occupations of upland and cold environments in inland Spain during the Last Glacial Maximum and Heinrich Stadial 1: The new Magdalenian sequence of Charco Verde II .....	10
GIULIO LUCARINI et al with MICHAEL PETRAGLIA – Plant, pigment, and bone processing in the Neolithic of northern Arabia–New evidence from Use-wear analysis of grinding tools at Jebel Oraf .....	11
Proceedings of the Royal Society B.....	11
<b>PAPERS</b> .....	11
THOMAS W. SCOTT & GEOFF WILD – How to make an inclusive-fitness model .....	11
Royal Society Open Science.....	11
<b>PAPERS</b> .....	11
SIMEON Q. SMEELE et al – Evidence for vocal signatures and voice-prints in a wild parrot.....	11
Science.....	12
<b>NEWS</b> .....	12
New footprint dates bolster claim that humans lived in Americas during Ice Age.....	12
<b>ARTICLES</b> .....	12
BENTE PHILIPPSEN – Dating the arrival of humans in the Americas.....	12
<b>PAPERS</b> .....	12
MATTHEW R. BENNETT et al – Evidence of humans in North America during the Last Glacial Maximum .....	12
JEFFREY S. PIGATI et al – Independent age estimates resolve the controversy of ancient human footprints at White Sands .....	12
Science Advances.....	12
<b>PAPERS</b> .....	12
MAHMOUD ABBAS et al with MICHAEL D. PETRAGLIA – Human dispersals out of Africa via the Levant.....	12
Trends in Cognitive Sciences .....	12
<b>PAPERS</b> .....	12
EMALIE MCMAHON & LEYLA ISIK – Seeing social interactions .....	12
Trends in Ecology and Evolution.....	13
<b>PAPERS</b> .....	13
ALISON M. BELL – The evolution of decision-making mechanisms under competing demands.....	13
ELEANOR M. CAVES et al – Backgrounds and the evolution of visual signals.....	13
<b>SUBSCRIBE to the EAORC Bulletin .....</b>	<b>13</b>
<b>UNSUBSCRIBE from the EAORC Bulletin .....</b>	<b>13</b>
<b>PRODUCED BY AND FOR THE EAORC EMAIL GROUP.....</b>	<b>13</b>

---

## NOTICES

### PUBLICATION ALERTS

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

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

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

---

### EDITORIAL INTERJECTIONS

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

---

### ACADEMIA.EDU – Language presupposes an enchronic infrastructure for social interaction

*In Daniel Dor, Chris Knight, and Jerome Lewis (eds), The Social Origins of Language, Oxford University Press (2014).*

#### **N.J. ENFIELD & JACK SIDNELL – Language presupposes an enchronic infrastructure for social interaction**

While some approaches to language evolution have been thoroughly linguistic yet without becoming particularly social, others have had the opposite problem. Coming out of an ethological tradition of research on primate social systems, Robin Dunbar hypothesized that language arose in our species as a way of managing or servicing social relationships, in a way analogous to physical grooming in apes and monkeys (Dunbar 1993, 1996b). The approach is grounded in research on the maintenance of social relations in complex social groups, but it has failed to gain traction in linguistics because, linguists say, the argument ‘does not say anything about the intricate grammatical structures of human languages’ (Hurford 1999: 182). ‘While language is used for social “grooming” purposes,’ says Hurford, ‘this emphasis fails to account for the impressive and subtle referential power of language’ (1999: 186). The sentiment points to a deep disconnect between the social and the linguistic in current research of relevance to language evolution. Either the researcher is handling the technicalities of language without really grasping what is going on socially, or vice versa. In this chapter, we want to draw attention to a sorely needed solution to this problem, taking as a starting point the behaviour of social interaction from a technical point of view, and seeing what language looks like from there.

[https://www.academia.edu/2622242/Language\\_presupposes\\_an\\_enchronic\\_infrastructure\\_for\\_social\\_interaction](https://www.academia.edu/2622242/Language_presupposes_an_enchronic_infrastructure_for_social_interaction)

---

### ACADEMIA.EDU – Archaeology, Evolution and Darwinism

*Issues in Ethnology and Anthropology 3:3, 81-100 (2008).*

#### **ALEKSANDAR PALAVESTRA & MARKO PORČIĆ – Archaeology, Evolution and Darwinism**

This paper presents a short history of the influence evolutionary thinking has had on anthropology and archaeology. The focus is on four major “schools” in evolutionist thought: the classical evolutionism of the 19th century, Neo-evolutionism, social biology (sociobiology) and Neo-Darwinian archaeology. The basic conclusion of this text is that the idea of socio-cultural evolution, understood in the broadest sense, has left a lasting impression on anthropological and archeological theory, and that it still represents a useful theoretical framework for new research.

[https://www.academia.edu/10334749/Archaeology\\_Evolution\\_and\\_Darwinism](https://www.academia.edu/10334749/Archaeology_Evolution_and_Darwinism)

---

### ACADEMIA.EDU – How sapiens became behaviourally modern

*Philosophical Transactions of the Royal Society B 366, 809-822 (2011).*

#### **KIM STERELNY – From hominins to humans: how sapiens became behaviourally modern**

This paper contributes to a debate in the palaeoarchaeological community about the major time-lag between the origin of anatomically modern humans and the appearance of typically human cultural behaviour. Why did humans take so long—at least 100,000 years—to become ‘behaviourally modern’? The transition is often explained as a change in the intrinsic cognitive competence of modern humans: often in terms of a new capacity for symbolic thought, or the final perfection of language. These cognitive breakthrough models are not satisfactory, for they fail to explain the uneven palaeoanthropological record of human competence. Many supposed signature capacities appear (and then disappear) before the supposed cognitive breakthrough; many of the signature capacities disappear again after the breakthrough. So, instead of seeing behavioural modernity as a simple reflection of a new kind of mind, this paper presents a niche construction conceptual model of behavioural modernity. Humans became behaviourally modern when they could reliably transmit accumulated informational capital to the next generation, and transmit it with sufficient precision for innovations to be preserved and accumulated. In turn, the reliable accumulation of culture depends on the construction of learning environments, not just intrinsic cognitive machinery. I argue that the model is (i) evolutionarily plausible: the elements of the model can be assembled incrementally, without implausible selective scenarios; (ii) the model coheres with the broad palaeoarchaeological record; (iii) the model is anthropologically and ethnographically plausible; and (iv) the model is testable, though only in coarse, preliminary ways.

[https://www.academia.edu/83239743/From\\_hominins\\_to\\_humans\\_how\\_sapiens\\_became\\_behaviourally\\_modern](https://www.academia.edu/83239743/From_hominins_to_humans_how_sapiens_became_behaviourally_modern)

---

## CONFERENCE ALERT – Perspectives on Speciation: Linnean Society of London, 11 April 2024

A one-day interdisciplinary symposium examining how the process of speciation is viewed from a diversity of disciplines.

Supported by the Integration of Speciation Research network of ESEB and by Oxford University Press.

Accompanied by a Special Issue of the Evolutionary Journal of the Linnean Society:

<https://academic.oup.com/evolinnean/pages/perspectives-on-speciation>

Attendance is possible in person or online - registration is required and in-person places are limited.

Details and registration at:

<https://www.eventbrite.com/e/perspectives-on-speciation-hybrid-meeting-tickets-728342330517>

Roger Butlin

Professor of Evolutionary Biology, School of Biosciences, The University of Sheffield

Guest Professor Marine Sciences, University of Gothenburg

Roger Butlin [r.k.butlin@sheffield.ac.uk](mailto:r.k.butlin@sheffield.ac.uk)

<https://littorina.sites.sheffield.ac.uk/>

---

## NEWS

---

### SAPIENS – Chimpanzees Can't Tell Us Much About Being Human

Although there is merit in recognizing how we resemble our primate relatives, sometimes we need to understand what sets our species apart.

<https://www.sapiens.org/biology/chimpanzees-cant-tell-us-much-about-being-human/>

---

### THE CONVERSATION – Consciousness: why a leading theory has been branded 'pseudoscience'

There's a battle over consciousness research – and whether it can be understood purely through science.

<https://theconversation.com/consciousness-why-a-leading-theory-has-been-branded-pseudoscience-214214>

---

### THE CONVERSATION – Female animals teach each other to choose unusual males – new research

A new study modelled how a game of snog, marry, avoid, may play out in the animal kingdom.

<https://theconversation.com/female-animals-teach-each-other-to-choose-unusual-males-new-research-214751>

---

### THE CONVERSATION – Humans got to America 7,000 years earlier than thought, new research confirms

The early settlement of the Americas is hugely contested area of archaeology.

<https://theconversation.com/humans-got-to-america-7-000-years-earlier-than-thought-new-research-confirms-213714>

---

### OTHER NEWS – INDEPENDENT – Scientific breakthrough confirms how early man left Africa 84,000ya

Early humans navigated along river channels while on their way to Eurasia, it's been claimed.

<https://www.independent.co.uk/news/science/early-man-left-africa-jordan-b2423115.html>

---

### OTHER NEWS – KNOWABLE MAGAZINE – Division of labor in ants, wasps, bees — and us

Social insects and humans share the trait of divvying up tasks, as do some fish. Researchers find that it emerges naturally, and it often doesn't take a boss to keep things in order.

<https://knowablemagazine.org/article/living-world/2023/evolution-of-division-of-labor>

---

## PUBLICATIONS

---

### American Journal of Biological Anthropology

#### PAPERS

#### JIAMING HUI & ANTOINE BALZEAU – The diploic venous system in Homo neanderthalensis and fossil Homo sapiens: A study using high-resolution computed tomography

The diploic venous system has been hypothesized to be related to human brain evolution, though its evolutionary trajectory and physiological functions remain largely unclear. This study examines the characteristics of the diploic venous channels (DCs) in a selection of well-preserved Homo neanderthalensis and Upper Paleolithic Homo sapiens crania, searching for the differences between the two taxa and exploring the associations between brain anatomy and DCs.

Five H. neanderthalensis and four H. sapiens fossil specimens from Western Europe were analyzed. Based on Micro-CT scanning and 3D reconstruction, the distribution pattern and draining orifices of the DCs were inspected qualitatively. The size of the DCs was quantified by volume calculation, and the degree of complexity was quantified by fractal analyses.

---

High-resolution data show the details of the DC structures not documented in previous studies. *H. neanderthalensis* and *H. sapiens* specimens share substantial similarities in the DCs. The noticeable differences between the two samples manifest in the connecting points surrounding the frontal sinuses, parietal foramina, and asterional area.

This study provides a better understanding of the anatomy of the DCs in *H. neanderthalensis* and *H. sapiens*. The connection patterns of the DCs have potential utility in distinguishing between the two taxa and in the phylogenetic and taxonomic discussion of the Neandertal-like specimens with controversial taxonomic status.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24843>

## REVIEWS

### SHARON M. YOUNG – Changing tides

Review of 'Period: The real story of menstruation' by Kate Clancy, Princeton University Press. 2023.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24851>

### ZACHARY THROCKMORTON – Pettitt's popular paleoanthropology book is engaging and accessible

Review of 'Homo Sapiens rediscovered: The scientific revolution rewriting our origins' by Paul Pettitt, Thames and Hudson. 2022.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24854>

## Current Biology

### PAPERS

#### JANA TEGELBECKERS et al – Lateral orbitofrontal cortex integrates predictive information across multiple cues to guide behavior

Individuals are often faced with multiple cues that concurrently predict the same outcome, and combining these predictions may benefit behavior. Previous work has studied the neural basis of decision-making, predominantly using isolated sensory stimuli, and so the mechanisms that allow us to leverage multiple cues remain unclear. In two experiments, we used neuroimaging and network-targeted brain stimulation to probe how the brain integrates outcome predictions to guide adaptive behavior. We identified neural signatures of outcome integration in the lateral orbitofrontal cortex (OFC), where concurrently presented cues evoke stronger pattern-based representations of expected outcomes. Moreover, perturbing lateral OFC network activity impairs subjects' ability to leverage predictions from multiple cues to facilitate responding. Intriguingly, we found similar behavioral and brain mechanisms for reward-predicting cues and for cues predicting the absence of reward. These findings highlight a causal role for the lateral OFC in utilizing outcome predictions from multiple cues to guide behavior.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)01279-4](https://www.cell.com/current-biology/fulltext/S0960-9822(23)01279-4)

## eLife

### PAPERS

#### ANJA T. ZAI et al – Goal-directed vocal planning in a songbird

Songbirds' vocal mastery is impressive, but to what extent is it a result of practice? Can they, similar to humans, plan targeted changes to their songs in a practice-free manner without intermittently singing? In adult zebra finches, we drive the pitch of a song syllable away from its stable (baseline) variant acquired from a tutor, then we withdraw reinforcement and subsequently deprive them of song experience by muting or deafening. In this deprived state, birds do not recover their baseline song. However, they revert their songs towards the target by about one standard deviation of their recent practice, provided the latter signaled a pitch mismatch with the target. Thus, targeted vocal plasticity does not require immediate sensory experience, showing that zebra finches are capable of goal-directed vocal planning.

<https://elifesciences.org/reviewed-preprints/90445>

#### ALAN V. RINCON et al – Higher social tolerance is associated with more complex facial behavior in macaques

The social complexity hypothesis for communicative complexity posits that animal societies with more complex social systems require more complex communication systems. We tested the social complexity hypothesis on three macaque species that vary in their degree of social tolerance and complexity. We coded facial behavior in >3000 social interactions across three social contexts (aggressive, submissive, affiliative) in 389 animals, using the Facial Action Coding System for macaques (MaqFACS). We quantified communicative complexity using three measures of uncertainty: entropy, specificity, and prediction error. We found that the relative entropy of facial behavior was higher for the more tolerant crested macaques as compared to the less tolerant Barbary and rhesus macaques across all social contexts, indicating that crested macaques more frequently use a higher diversity of facial behavior. The context specificity of facial behavior was higher in rhesus as compared to Barbary and crested macaques, demonstrating that Barbary and crested macaques used facial behavior more flexibly across different social contexts. Finally, a random forest classifier predicted social context from facial behavior with highest accuracy for rhesus and lowest for crested, indicating there is higher uncertainty and complexity in the facial behavior of crested macaques. Overall, our results support the social complexity hypothesis.

<https://elifesciences.org/articles/87008>

## Frontiers in Mammal Science

### PAPERS

#### **ZDRAVKO PETANJEK et al – Von Economo neurons as a specialized neuron class of the human cerebral cortex**

By studying human cortical cytoarchitecture, von Economo noticed large spindle-shaped-neurons within layer Vb in the anterior-cingulate and fronto-insular cortex. Those neurons had such extremely elongated stick-like or corkscrew-like soma shape that appeared to him as a pathological alteration. Eventually, he realized that this was a specialized-type of neuron which he described as distinct from the main cortical cell populations, including the commonly found spindle cells. Data from recent studies suggest that specialized-stick-corkscrew-neurons may have first developed in the fronto-insular cortex before the division of hominids and Old World monkeys, and that they have become abundant in the anterior-cingulate cortex only in the hominid line. Golgi analysis found that they have distinctive somato-dendritic morphology with a characteristic very distal position of their axon origin. Many additional studies claimed to find cells similar to the specialized cells described by von Economo in other non-primate species, even in functionally unrelated cortical regions and layers. However, these studies did not provide sufficient evidence that the cells they described are indeed distinct from common spindle-shaped-neurons, and that they truly correspond to the specialized-stick-corkscrew-cells described by von Economo. We believe that present evidence primarily supports the presence of specialized-stick-corkscrew-neurons in hominids, with a seeming increase in their number in humans compared to other primates. The functional significance of such neuronal specialization within specific areas of the human cerebral cortex remains to be elucidated.

<https://www.frontiersin.org/articles/10.3389/fmamm.2023.1242289/full>

## Human Nature

### PAPERS

#### **CODY MOSER et al – Aggressive Mimicry and the Evolution of the Human Cognitive Niche**

The evolutionary origins of deception and its functional role in our species is a major focus of research in the science of human origins. Several hypotheses have been proposed for its evolution, often packaged under either the Social Brain Hypothesis, which emphasizes the role that the evolution of our social systems may have played in scaffolding our cognitive traits, and the Foraging Brain Hypothesis, which emphasizes how changes in the human dietary niche were met with subsequent changes in cognition to facilitate foraging of difficult-to-acquire foods. Despite substantive overlap, these hypotheses are often presented as competing schools of thought, and there have been few explicitly proposed theoretical links unifying the two. Utilizing cross-cultural data gathered from the Human Relations Area Files (HRAF), we identify numerous (n = 357) examples of the application of deception toward prey across 145 cultures. By comparing similar behaviors in nonhuman animals that utilize a hunting strategy known as aggressive mimicry, we suggest a potential pathway through which the evolution of deception may have taken place. Rather than deception evolving as a tactic for deceiving conspecifics, we suggest social applications of deception in humans could have evolved from an original context of directing these behaviors toward prey. We discuss this framework with regard to the evolution of other mental traits, including language, Theory of Mind, and empathy.

<https://link.springer.com/article/10.1007/s12110-023-09458-y>

#### **PAOLA CERRITO & JUDITH M. BURKART – Human Amygdala Volumetric Patterns Converently Evolved in Cooperatively Breeding and Domesticated Species**

The amygdala is a hub in brain networks that supports social life and fear processing. Compared with other apes, humans have a relatively larger lateral nucleus of the amygdala, which is consistent with both the self-domestication and the cooperative breeding hypotheses of human evolution. Here, we take a comparative approach to the evolutionary origin of the relatively larger lateral amygdala nucleus in humans. We carry out phylogenetic analysis on a sample of 17 mammalian species for which we acquired single amygdala nuclei volumetric data. Our results indicate that there has been convergent evolution toward larger lateral amygdala nuclei in both domesticated and cooperatively breeding mammals. These results suggest that changes in processing fearful stimuli to reduce fear-induced aggression, which are necessary for domesticated and cooperatively breeding species alike, tap into the same neurobiological proximate mechanism. However, humans show changes not only in processing fearful stimuli but also in proactive prosociality. Since cooperative breeding, but not domestication, is also associated with increased proactive prosociality, a prominent role of the former during human evolution is more parsimonious, whereas self-domestication may have been involved as an additional stepping stone.

<https://link.springer.com/article/10.1007/s12110-023-09461-3>

## Nature

### PAPERS

#### **ABHISHEK SHARMA et al – Assembly theory explains and quantifies selection and evolution**

Scientists have grappled with reconciling biological evolution<sup>1,2</sup> with the immutable laws of the Universe defined by physics. These laws underpin life's origin, evolution and the development of human culture and technology, yet they do not predict

the emergence of these phenomena. Evolutionary theory explains why some things exist and others do not through the lens of selection. To comprehend how diverse, open-ended forms can emerge from physics without an inherent design blueprint, a new approach to understanding and quantifying selection is necessary<sup>3,4,5</sup>. We present assembly theory (AT) as a framework that does not alter the laws of physics, but redefines the concept of an ‘object’ on which these laws act. AT conceptualizes objects not as point particles, but as entities defined by their possible formation histories. This allows objects to show evidence of selection, within well-defined boundaries of individuals or selected units. We introduce a measure called assembly (A), capturing the degree of causation required to produce a given ensemble of objects. This approach enables us to incorporate novelty generation and selection into the physics of complex objects. It explains how these objects can be characterized through a forward dynamical process considering their assembly. By reimagining the concept of matter within assembly spaces, AT provides a powerful interface between physics and biology. It discloses a new aspect of physics emerging at the chemical scale, whereby history and causal contingency influence what exists.

<https://www.nature.com/articles/s41586-023-06600-9>

## REVIEWS

### **JOSIE GLAUSIUSZ – A ‘user’s manual for the female mammal’ – how women’s bodies evolved**

The female perspective is often missed in evolutionary tales, but it is at the centre of what makes us human.

Review of ‘Eve: How the Female Body Drove 200 Million Years of Human Evolution’ by Cat Bohannon, Knopf/Hutchinson Heinemann (2023).

<https://www.nature.com/articles/d41586-023-03059-6>

## Nature Communications

### PAPERS

### **MASAKAZU AGETSUMA et al – Activity-dependent organization of prefrontal hub-networks for associative learning and signal transformation**

Associative learning is crucial for adapting to environmental changes. Interactions among neuronal populations involving the dorso-medial prefrontal cortex (dmPFC) are proposed to regulate associative learning, but how these neuronal populations store and process information about the association remains unclear. Here we developed a pipeline for longitudinal two-photon imaging and computational dissection of neural population activities in male mouse dmPFC during fear-conditioning procedures, enabling us to detect learning-dependent changes in the dmPFC network topology. Using regularized regression methods and graphical modeling, we found that fear conditioning drove dmPFC reorganization to generate a neuronal ensemble encoding conditioned responses (CR) characterized by enhanced internal coactivity, functional connectivity, and association with conditioned stimuli (CS). Importantly, neurons strongly responding to unconditioned stimuli during conditioning subsequently became hubs of this novel associative network for the CS-to-CR transformation. Altogether, we demonstrate learning-dependent dynamic modulation of population coding structured on the activity-dependent formation of the hub network within the dmPFC.

<https://www.nature.com/articles/s41467-023-41547-5>

### **JOSÉ M. GÓMEZ, A. GÓNZALEZ-MEGÍAS & M. VERDÚ – The evolution of same-sex sexual behaviour in mammals**

Same-sex sexual behaviour has attracted the attention of many scientists working in disparate areas, from sociology and psychology to behavioural and evolutionary biology. Since it does not contribute directly to reproduction, same-sex sexual behaviour is considered an evolutionary conundrum. Here, using phylogenetic analyses, we explore the evolution of same-sex sexual behaviour in mammals. According to currently available data, this behaviour is not randomly distributed across mammal lineages, but tends to be particularly prevalent in some clades, especially primates. Ancestral reconstruction suggests that same-sex sexual behaviour may have evolved multiple times, with its appearance being a recent phenomenon in most mammalian lineages. Our phylogenetically informed analyses testing for associations between same-sex sexual behaviour and other species characteristics suggest that it may play an adaptive role in maintaining social relationships and mitigating conflict.

<https://www.nature.com/articles/s41467-023-41290-x>

### **ZSUZSANNA KOCSIS et al – Immediate neural impact and incomplete compensation after semantic hub disconnection**

The human brain extracts meaning using an extensive neural system for semantic knowledge. Whether broadly distributed systems depend on or can compensate after losing a highly interconnected hub is controversial. We report intracranial recordings from two patients during a speech prediction task, obtained minutes before and after neurosurgical treatment requiring disconnection of the left anterior temporal lobe (ATL), a candidate semantic knowledge hub. Informed by modern diaschisis and predictive coding frameworks, we tested hypotheses ranging from solely neural network disruption to complete compensation by the indirectly affected language-related and speech-processing sites. Immediately after ATL disconnection, we observed neurophysiological alterations in the recorded frontal and auditory sites, providing direct evidence for the importance of the ATL as a semantic hub. We also obtained evidence for rapid, albeit incomplete, attempts at neural network compensation, with neural impact largely in the forms stipulated by the predictive coding framework, in

specificity, and the modern diaschisis framework, more generally. The overall results validate these frameworks and reveal an immediate impact and capability of the human brain to adjust after losing a brain hub.

<https://www.nature.com/articles/s41467-023-42088-7>

---

## Nature Humanities & Social Sciences Communications

### PAPERS

#### **MARCELA PARADA-CONTZEN & JOSÉ RIGOBERTO PARADA-DAZA – On the weighting of homo economicus and homo virtus in human behaviour**

In economic sciences, most analyses focus on the economic person construct. However, this that formalization does not capture the complex nature of human behaviour. This paper estimates the weight that economic and noneconomic dimensions of human behaviour have on wellbeing. A utility function is considered that models behaviour from a complex standpoint, where the motivations of the economic individual (homo economicus) are analysed in a broad perspective by integrating emotional wellbeing and human virtues into the model (homo virtus). Three empirical measures of wellbeing are used: The Well-Being Index developed by the Boston Consulting Group's Sustainable Economic Development Assessment (2008–2018), the Index of Economic Well-Being from the Centre for the Study of Living Standards (1980–2014), and the Happiness Score from the World Happiness Report (2005–2018). Depending on data availability, the model is estimated globally for all countries, OECD countries, European countries, and developing countries using linear regression methods. The results indicate that, on average, the homo virtus dimension of behaviour has a weight of 11% in countries' wellbeing functions, while the economic perspective has a weight of 89%. Additionally, the results show that richer countries value economic factors more than poorer countries. The analyses also show that the maximum level of emotional satisfaction is higher for European and OECD countries than for developing countries.

<https://www.nature.com/articles/s41599-023-02142-7>

---

## Nature Mental Health

### PAPERS

#### **RACHEL G. ZSIDO et al – Ultra-high-field 7T MRI reveals changes in human medial temporal lobe volume in female adults during menstrual cycle**

Ovarian hormones have substantial effects on the brain, and early menopause has been associated with increased risk of accelerated brain aging and dementia later in life. However, the impact of ovarian hormone fluctuations on brain structure earlier in life is less understood. Here we show that ovarian hormone fluctuations shape structural brain plasticity during the reproductive years. We use longitudinal ultra-high field neuroimaging across the menstrual cycle to map the morphology of medial temporal lobe subregions in 27 participants. Controlling for water content and blood flow, our findings reveal positive associations between estradiol and parahippocampal cortex volume, progesterone and subiculum and perirhinal area 35 volumes, and an estradiol\*progesterone interaction with CA1 volume. This research offers a blueprint for future studies on the shared dynamics of the brain and ovarian function and a fundamental stepping stone towards developing sex-specific strategies to improve brain health and mental health.

<https://www.nature.com/articles/s44220-023-00125-w>

---

## Nature Reviews Neuroscience

### PAPERS

#### **ILANA HARRIS et al – Is song processing distinct and special in the auditory cortex?**

Is the singing voice processed distinctively in the human brain? In this Perspective, we discuss what might distinguish song processing from speech processing in light of recent work suggesting that some cortical neuronal populations respond selectively to song and we outline the implications for our understanding of auditory processing. We review the literature regarding the neural and physiological mechanisms of song production and perception and show that this provides evidence for key differences between song and speech processing. We conclude by discussing the significance of the notion that song processing is special in terms of how this might contribute to theories of the neurobiological origins of vocal communication and to our understanding of the neural circuitry underlying sound processing in the human cortex.

<https://www.nature.com/articles/s41583-023-00743-4>

---

## Nature Scientific Reports

### PAPERS

#### **CAMILLE LACROUX et al – Chimpanzees select comfortable nesting tree species**

Every evening, chimpanzees build sleeping “nests” in trees. In some studied communities, individuals appear to be selective about the tree species used, which has led researchers to hypothesize whether chimpanzees prefer trees that repel troublesome insects or/and that provide comfortable and stable structures. We investigate these hypotheses, or a trade-off between both, through study of tree species preference based on their biomechanical and/or biochemical properties in the Sebitoli chimpanzee community in Kibale National Park, Uganda. The ten tree species most frequently used for nesting were



compared with ten abundant in their environment but not preferred for nesting. For these 20 tree species, we determined their biomechanical and morphological characteristics such as foliar density, foliar units form (shape and size) and branch rigidity. Their spatial repellent activity, previously tested against *Anopheles gambiae* was incorporated into the analysis. Chimpanzees chose tree species with medium-sized and elongated foliar units, high foliar density and branch with stiffer wood. In addition, most tree species with such mechanical and morphological properties also have mosquito repellent activity. These tree properties may provide a comfortable sleeping environment enhancing sleep quality. Finally, a comparison across chimpanzee communities would be relevant to understand whether these choices are not only ecological but also cultural.

<https://www.nature.com/articles/s41598-023-44192-6>

#### **ANTONIO ARNAIZ-VILLENA et al – Major histocompatibility complex complement (MHC) Bf alleles show trans species evolution between man and chimpanzee**

HLA and disease studies by using single allele statistics have been fruitless during the last 40 years for explaining association pathogenesis of the associated diseases. Other approaches are necessary to untangle this puzzle. We aim to revisit complement allelism in humans and primates for both studying MHC and disease association to complotypes and extended MHC haplotypes in order to also explain the positive directional selection of maintaining immune response genes (complement, MHC adaptive and MHC non-specific genes) that keeps these three type of genes together in a short chromosome stretch (MHC) for million years. These genes may be linked to conjointly avoid microbes attack and autoimmunity. In the present paper, it is obtained a new Bf chimpanzee allele, provisionally named Patr-Bf\*A:01, that differs from other Bf alleles by having CTG at eleventh codon of exon 2 in order to start the newly suggested methodology and explain functional and evolutionary MHC obscure aspects. Exons 1 to 6 of Ba fragment of Bf gene were obtained from chimpanzee. This new chimpanzee Factor B allele (Patr-Bf\*A:01) is to be identical to a infrequent human Bf allele (SNP rs641153); it stresses the strong evolutive pressure upon certain alleles that are trans specific. It also may apply to MHC extended haplotypes which may conjointly act to start an adequate immune response. It is the first time that a complement MHC class III allele is described to undergo trans species evolution, in contrast to class I and class II alleles which had already been reported. Allelism of complement factors are again proposed for studying MHC complement genes, complotypes, and extended MHC haplotypes which may be more informative that single MHC marker studies.

<https://www.nature.com/articles/s41598-023-42016-1>

#### **MASAKI SHIMADA & WATARU YANO – Behavioral responses of wild chimpanzees toward a juvenile that suddenly lost its animacy due to a fall accident**

Detailed observations of animal reactions to a collapsed individual in wild are rare but essential to debates about the perception of death by nonhuman animals, including chimpanzees. A male juvenile chimpanzee named Volta, a member of the M group in the Mahale Mountains National Park, fell from a tall tree and was temporarily incapacitated, suffering a severe concussion and nasal bone fracture. However, Volta showed signs of gradual recovery. We compared the behavior of other chimpanzees towards Volta with the previous reports on the behavior towards collapsed or recently dead group members. We found that behaviors towards Volta were similar to those observed towards collapsed or dead members. These included other-regarding behaviors and aggressive behaviors, and notably, licking of Volta's blood, which has not been previously reported. Adult males tended to be in close proximity to Volta for longer periods than adult females. The social situation with adult males including alpha male, surrounding Volta likely influenced the behavior of other individuals. Exploring the state of recovery of the injured individual, by closely approaching, directing various behaviors, and observing the reactions of the victim, and demonstrate tolerance and consideration towards the victim.

<https://www.nature.com/articles/s41598-023-43229-0>

#### **BALARAJU BATTU – Co-evolution of conditional cooperation and social norm**

The co-evolution of conditional cooperation and social norms has garnered significant attention, yet the underlying mechanisms remain elusive. Social norms result from empirical expectations, individual expectations of group behavior, and normative expectations, the population's expectations of individual behavior. Aligning these expectations aids in norm formation, but diverse individual reactions to observed behavior and their sensitivity to norm conformity can be challenging. In our study, the agents are initially endowed with diverse conditional expectations, which mirror their anticipations regarding group behavior and their inherent inclination to conform to social norms, indicative of their sensitivity to psychic costs. These agents engage in a repeated public goods game, where their decisions to cooperate are shaped by their conditional expectations and the observed levels of cooperation within their group. Concurrently, free riders experience psychic costs determined by the overall level of cooperation, contribution costs, and the individual's inclination to adhere to social norms. Remarkably, our simulations unveil that agents commencing with random conditional expectations and a propensity to conform to norms can adapt to lower conditional expectations and moderate their propensity to conform to norms when initial cooperation levels are high and the contribution cost is reduced. Interestingly, increasing contribution costs intensify the population's response to norm enforcement, but this doesn't always result in a corresponding increase in cooperation. By incorporating population diversity and accounting for empirical and normative expectations within our

model, we gain valuable insights into the intricate relationship between conditional cooperation and the emergence of social norms.

<https://www.nature.com/articles/s41598-023-43918-w>

## Neuron

### PAPERS

#### **MAURICIO R. DELGADO, DOMINIC S. FARERI & LUKE J. CHANG – Characterizing the mechanisms of social connection**

Understanding how individuals form and maintain strong social networks has emerged as a significant public health priority as a result of the increased focus on the epidemic of loneliness and the myriad protective benefits conferred by social connection. In this review, we highlight the psychological and neural mechanisms that enable us to connect with others, which in turn help buffer against the consequences of stress and isolation. Central to this process is the experience of rewards derived from positive social interactions, which encourage the sharing of perspectives and preferences that unite individuals. Sharing affective states with others helps us to align our understanding of the world with another's, thereby continuing to reinforce bonds and strengthen relationships. These psychological processes depend on neural systems supporting reward and social cognitive function. Lastly, we also consider limitations associated with pursuing healthy social connections and outline potential avenues of future research.

[https://www.cell.com/neuron/fulltext/S0896-6273\(23\)00699-2](https://www.cell.com/neuron/fulltext/S0896-6273(23)00699-2)

## Philosophical Transactions of the Royal Society B

### CORRECTIONS

#### **SVEN GRAWUNDER et al with ROMAN M. WITTIG & CATHERINE CROCKFORD – Correction: ‘Chimpanzee vowel-like sounds and voice quality suggest formant space expansion through the hominoid lineage’ (2021), by Grawunder et al.**

Following discussion about formant measures, we amend the following aspects of the original paper. Note that the key results remain unchanged. For the first result, broad chimpanzee call types, hoos, grunts, screams and barks, though graded, can be discriminated using acoustic parameters or only lip and jaw articulatory measures. For the second result, the chimpanzee formant space appears expanded compared to African and Asian monkeys, embracing two of the three F1/F2 formant space extremities used in humans. Specifically, chimpanzee compared to monkey vocalizations encompass both [u] and [a] extremities, rather than only one or no extremities. However, the third extremity [i], appears outside the capacity of the few primate species examined to date, and may represent a derived capacity in the hominin lineage.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2023.0319>

## PLoS One

### PAPERS

#### **MARIA MARTZOUKOU, DIMITRIOS PAPADOPOULOS & MARY H. KOSMIDIS – Syntactic and affective prosody recognition: Schizophrenia vs. Autism spectrum disorders**

accompanying intellectual impairment (ASD w/o intellectual impairment) during their adulthood share several clinical characteristics. Exploring under-investigated aspects of these two clinical conditions may shed light on their possible connection and facilitate differential diagnosis at very early stages. To this end, we explored the ability of 15 adults with a recent diagnosis of schizophrenia, 15 individuals diagnosed with ASD w/o intellectual impairment as adults, and 15 healthy adults to resolve sentence ambiguities with the use of syntactic prosody, and to decode happiness, anger, sadness, surprise, fear, and neutrality based on affective prosody. Results revealed intact perception of syntactic prosody in adults with schizophrenia, but impaired affective prosody recognition, which could be attributed, however, to emotion processing difficulties overall. On the other hand, individuals with ASD w/o intellectual impairment were impaired on prosody comprehension per se, as evidenced in the most challenging conditions, namely the subject-reading condition and the emotion of surprise. The differences in prosody comprehension ability between the two clinical conditions may serve as an indicator, among other signs, during the diagnostic evaluation.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0292325>

#### **JAVIER ARAGONCILLO-DEL RÍO et al – Human occupations of upland and cold environments in inland Spain during the Last Glacial Maximum and Heinrich Stadial 1: The new Magdalenian sequence of Charco Verde II**

The settlement of cold and arid environments by Pleistocene hunter-gatherers has been a heated topic in Paleolithic Archaeology and the Quaternary Sciences for years. In the Iberian Peninsula, a key area for studying human adaptations to such environments is composed by the large interior and upland regions of the northern and southern plateaus (Mesetas) and bordering areas. As, traditionally, these regions have been relatively under-investigated compared to the ecologically more favored coastal areas of the peninsula, our knowledge of the human settlement of the whole Iberian hinterland remains scarce for the Last Glacial. In this paper we present the discovery and first geoarchaeological, paleoenvironmental and chronometric evidence obtained at Charco Verde II, a new site close to the southwestern foothills of the Iberian system range (Guadalajara province, Spain), bearing a sequence of Magdalenian human occupations starting at least at 20.8–21.4 ka cal BP during the Last Glacial Maximum, and covering Greenland Stadial 2 until ~15.1–16.6 ka cal BP, including Heinrich

stadial 1. As this site is located in an upland region which today faces one of the harshest climates in Iberia, such occupation sequence, occurred during some of the coldest and most arid phases of the Last Glacial, has relevant implications for our understanding of human-environment-climate interactions and population dynamics in Iberia and Western Europe. These findings support the hypothesis that the Iberian hinterland was not avoided by Upper Paleolithic hunter-gatherers due to ecological constraints, but it hosted a complex and relatively dense settlement at least in some areas, even during cold periods. This suggest, one more time, that the historical scarcity of Upper Paleolithic sites in inland Iberia is, to a significant extent, an artifact of research bias.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0291516>

**GIULIO LUCARINI et al with MICHAEL PETRAGLIA – Plant, pigment, and bone processing in the Neolithic of northern Arabia–New evidence from Use-wear analysis of grinding tools at Jebel Oraf**

Archaeological sites with surface hearths are a ubiquitous feature across the arid zones of the Arabian interior. At Jebel Oraf, in the Jubbah basin of the Nefud Desert of northern Arabia, numerous grinding stone fragments were found in association with hearths, though the original purpose of these stones was unclear owing to the poor preservation of faunal and botanic remains. Here we describe results from use-wear analysis on five grinding tools at Jebel Oraf, demonstrating that such artefacts were used during the Neolithic for plant processing, bone processing, and pigment production. Grinding stones were often broken up after initial use and fragments were subsequently re-used for alternative purposes, before finally being placed on hearths or discarded. More specifically, plants were ground or prepared and possibly cooked in the hearths, and bones were processed as well. The analyses also highlight the importance of pigment processing at Neolithic sites and provide a link to painted rock art. The frequent use of pigment in the archaeological record suggests that pigment was widely used, and that Neolithic painted art may have been more common than the surviving images suggest.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0291085>

**Proceedings of the Royal Society B**

**PAPERS**

**THOMAS W. SCOTT & GEOFF WILD – How to make an inclusive-fitness model**

Social behaviours are typically modelled using neighbour-modulated fitness, which focuses on individuals having their fitness altered by neighbours. However, these models are either interpreted using inclusive fitness, which focuses on individuals altering the fitness of neighbours, or not interpreted at all. This disconnect leads to interpretational mistakes and obscures the adaptive significance of behaviour. We bridge this gap by presenting a systematic methodology for constructing inclusive-fitness models. We find a behaviour's 'inclusive-fitness effect' by summing primary and secondary deviations in reproductive value. Primary deviations are the immediate result of a social interaction; for example, the cost and benefit of an altruistic act. Secondary deviations are compensatory effects that arise because the total reproductive value of the population is fixed; for example, the increased competition that follows an altruistic act. Compared to neighbour-modulated fitness methodologies, our approach is often simpler and reveals the model's inclusive-fitness narrative clearly. We implement our methodology first in a homogeneous population, with supplementary examples of help under synergy, help in a viscous population and Creel's paradox. We then implement our methodology in a class-structured population, where the advantages of our approach are most evident, with supplementary examples of altruism between age classes, and sex-ratio evolution.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.1310>

**Royal Society Open Science**

**PAPERS**

**SIMEON Q. SMEELE et al – Evidence for vocal signatures and voice-prints in a wild parrot**

In humans, identity is partly encoded in a voice-print that is carried across multiple vocalizations. Other species also signal vocal identity in calls, such as shown in the contact call of parrots. However, it remains unclear to what extent other call types in parrots are individually distinct, and whether there is an analogous voice-print across calls. Here we test if an individual signature is present in other call types, how stable this signature is, and if parrots exhibit voice-prints across call types. We recorded 5599 vocalizations from 229 individually marked monk parakeets (*Myiopsitta monachus*) over a 2-year period in Barcelona, Spain. We examined five distinct call types, finding evidence for an individual signature in three. We further show that in the contact call, while birds are individually distinct, the calls are more variable than previously assumed, changing over short time scales (seconds to minutes). Finally, we provide evidence for voice-prints across multiple call types, with a discriminant function being able to predict caller identity across call types. This suggests that monk parakeets may be able to use vocal cues to recognize conspecifics, even across vocalization types and without necessarily needing active vocal signatures of identity.

<https://royalsocietypublishing.org/doi/10.1098/rsos.230835>

## Science

### NEWS

#### **New footprint dates bolster claim that humans lived in Americas during Ice Age**

Finding could reopen debate on how and when humans arrived. But some researchers remain skeptical.

<https://www.science.org/content/article/new-footprint-dates-bolster-claim-human-arrival-americas-during-ice-age>

### ARTICLES

#### **BENTE PHILIPPSEN – Dating the arrival of humans in the Americas**

A debate about the age of ancient footprints continues

<https://www.science.org/doi/10.1126/science.adk3075>

### PAPERS

#### **MATTHEW R. BENNETT et al – Evidence of humans in North America during the Last Glacial Maximum**

Archaeologists and researchers in allied fields have long sought to understand human colonization of North America. Questions remain about when and how people migrated, where they originated, and how their arrival affected the established fauna and landscape. Here, we present evidence from excavated surfaces in White Sands National Park (New Mexico, United States), where multiple in situ human footprints are stratigraphically constrained and bracketed by seed layers that yield calibrated radiocarbon ages between ~23 and 21 thousand years ago. These findings confirm the presence of humans in North America during the Last Glacial Maximum, adding evidence to the antiquity of human colonization of the Americas and providing a temporal range extension for the coexistence of early inhabitants and Pleistocene megafauna.

<https://www.science.org/doi/10.1126/science.abg7586>

#### **JEFFREY S. PIGATI et al – Independent age estimates resolve the controversy of ancient human footprints at White Sands**

Human footprints at White Sands National Park, New Mexico, USA, reportedly date to between ~23,000 and 21,000 years ago according to radiocarbon dating of seeds from the aquatic plant *Ruppia cirrhosa*. These ages remain controversial because of potential old carbon reservoir effects that could compromise their accuracy. We present new calibrated 14C ages of terrestrial pollen collected from the same stratigraphic horizons as those of the *Ruppia* seeds, along with optically stimulated luminescence ages of sediments from within the human footprint-bearing sequence, to evaluate the veracity of the seed ages. The results show that the chronologic framework originally established for the White Sands footprints is robust and reaffirm that humans were present in North America during the Last Glacial Maximum.

<https://www.science.org/doi/10.1126/science.adh5007>

---

## Science Advances

### PAPERS

#### **MAHMOUD ABBAS et al with MICHAEL D. PETRAGLIA – Human dispersals out of Africa via the Levant**

*Homo sapiens* dispersed from Africa into Eurasia multiple times in the Middle and Late Pleistocene. The route, across northeastern Africa into the Levant, is a viable terrestrial corridor, as the present harsh southern Levant would probably have been savannahs and grasslands during the last interglaciation. Here, we document wetland sediments with luminescence ages falling in the last interglaciation in the southern Levant, showing protracted phases of moisture availability. Wetland sediments in Wadi Gharandal containing Levallois artifacts yielded an age of 84 ka. Our findings support the growing consensus for a well-watered Jordan Rift Valley that funneled migrants into western Asia and northern Arabia.

<https://www.science.org/doi/10.1126/sciadv.adi6838>

---

## Trends in Cognitive Sciences

### PAPERS

#### **EMALIE MCMAHON & LEYLA ISIK – Seeing social interactions**

Seeing the interactions between other people is a critical part of our everyday visual experience, but recognizing the social interactions of others is often considered outside the scope of vision and grouped with higher-level social cognition like theory of mind. Recent work, however, has revealed that recognition of social interactions is efficient and automatic, is well modeled by bottom-up computational algorithms, and occurs in visually-selective regions of the brain. We review recent evidence from these three methodologies (behavioral, computational, and neural) that converge to suggest the core of social interaction perception is visual. We propose a computational framework for how this process is carried out in the brain and offer directions for future interdisciplinary investigations of social perception.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00248-6](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00248-6)

## Trends in Ecology and Evolution

### PAPERS

#### **ALISON M. BELL – The evolution of decision-making mechanisms under competing demands**

Animals in nature are constantly managing multiple demands, and decisions about how to adjust behavior in response to ecologically relevant demands is critical for fitness. Evidence for behavioral correlations across functional contexts (behavioral syndromes) and growing appreciation for shared proximate substrates of behavior prompts novel questions about the existence of distinct neural, molecular, and genetic mechanisms involved in decision-making. Those proximate mechanisms are likely to be an important target of selection, but little is known about how they evolve, their evolutionary history, or where they harbor genetic variation. Herein I provide a conceptual framework for understanding the evolution of mechanisms for decision-making, highlighting insights on decision-making in humans and model organisms, and sketch an emerging synthesis.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(23\)00238-0](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(23)00238-0)

#### **ELEANOR M. CAVES et al – Backgrounds and the evolution of visual signals**

Color signals which mediate behavioral interactions across taxa and contexts are often thought of as color 'patches' – parts of an animal that appear colorful compared to other parts of that animal. Color patches, however, cannot be considered in isolation because how a color is perceived depends on its visual background. This is of special relevance to the function and evolution of signals because backgrounds give rise to a fundamental tradeoff between color signal detectability and discriminability: as its contrast with the background increases, a color patch becomes more detectable, but discriminating variation in that color becomes more difficult. Thus, the signal function of color patches can only be fully understood by considering patch and background together as an integrated whole.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(23\)00237-9](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(23)00237-9)

---

## SUBSCRIBE to the EAORC Bulletin

If you would like to subscribe to this free weekly newsletter, please contact [martin.edwardes@btopenworld.com](mailto:martin.edwardes@btopenworld.com).

---

## UNSUBSCRIBE from the EAORC Bulletin

Send an email to [martin.edwardes@btopenworld.com](mailto:martin.edwardes@btopenworld.com) with the subject "EAORC unsubscribe".

---

## PRODUCED BY AND FOR THE EAORC EMAIL GROUP

EAORC is a fee-free academic internet news service and has no commercial sponsorship or other commercial interests.

EAORC website information is at <http://martinedwardes.me.uk/eaorc/>

If you have received this bulletin, and are unhappy about receiving it, please contact [martin.edwardes@btopenworld.com](mailto:martin.edwardes@btopenworld.com).