

EAORC BULLETIN 1,058 – 24 September 2023

CONTENTS

NOTICES	2
PUBLICATION ALERTS.....	2
EDITORIAL INTERJECTIONS.....	2
ACADEMIA.EDU – Neo-Pragmatism and Enactive Intentionality.....	3
SHAUN GALLAGHER & KATSUNORI MIYAHARA – Neo-Pragmatism and Enactive Intentionality.....	3
NEWS	3
GUARDIAN SCIENCE – Justice for Neanderthals! What the debate about our long-dead cousins reveals.....	3
NATURE BRIEFING – Jawbone hints at new human species.....	3
NATURE BRIEFING – These logs could be earliest wood structure.....	3
NATURE BRIEFING – Consciousness theory ‘is pseudoscience’.....	3
SAPIENS – Will the Iconic Skull of an Ancient Human Return to Zambia?.....	3
SCIENCEADVISER – Structure found near Kalambo Falls in Zambia likely crafted by archaic human relatives.....	3
SCIENCE.ORG NEWS – 500ky-old ‘Lincoln Logs’ may be wood structure made by ancient humans.....	3
SCIENCE.ORG NEWS – Ancient Amazonians created mysterious ‘dark earth’ on purpose.....	4
PUBLICATIONS	4
eLife.....	4
PAPERS	4
MICHAEL KLEINMAN et al – A cortical information bottleneck during decision-making.....	4
AMÉLIE BEAUDET & EDWIN DE JAGER – Broca’s area, variation and taxic diversity in early Homo from Koobi Fora (Kenya).....	4
Frontiers in Earth Science.....	4
PAPERS	4
JUAN I. MORALES et al – A new assemblage of late Neanderthal remains from Cova Simanya (NE Iberia).....	4
Frontiers in Psychology.....	5
PAPERS	5
ANETT RAGÓ, ZSUZSANNA VARGA & MIKLOS SZABO – Stable organization of the early lexical-semantic network in 18- and 24-month-old preterm and full-term infants: an eye-tracker study.....	5
Heliyon.....	5
PAPERS	5
ALEXANDER KRAUSS – Homo methodologicus and the origin of science and civilisation.....	5
Linguistic Anthropology.....	5
PAPERS	5
CHARLES H.P. ZUCKERMAN & N.J. ENFIELD – The limits of thematization.....	5
Nature.....	6
NEWS	6
Consciousness theory slammed as ‘pseudoscience’ — sparking uproar.....	6
These ancient whittled logs could be the earliest known wooden structure.....	6
A new human species? Mystery surrounds 300,000-year-old fossil.....	6
ARTICLES	6
ANNEMIEKE MILKS – Hominins built with wood 476,000 years ago.....	6
PAPERS	6
L. BARHAM et al – Evidence for the earliest structural use of wood at least 476,000 years ago.....	6
Nature Human Behaviour.....	6
ARTICLES	6
Large-scale AI language systems display an emergent ability to reason by analogy.....	6
PAPERS	6
TAYLOR WEBB, KEITH J. HOLYOAK & HONGJING LU – Emergent analogical reasoning in large language models.....	6
GUANGYAO ZHANG et al – A social-semantic working-memory account for two canonical language areas.....	7
Nature Reviews Genetics.....	7
PAPERS	7
STÉPHANE PEYRÉNE, VIVIANE SLON & JANET KELSO – More than a decade of genetic research on the Denisovans.....	7
Nature Reviews Neuroscience.....	7
ARTICLES	7

KATHERINE WHALLEY – Restoring speech.....	7
PAPERS.....	7
YU-TING TSENG et al – Defensive responses: behaviour, the brain and the body	7
Nature Scientific Reports.....	8
PAPERS.....	8
KRISTEN E. LI et al – Age-related increases in right hemisphere support for prosodic processing in children	8
FABIEN CARRERAS & CHRIS J. A. MOULIN – Evidence for a metacognitive awareness of autobiographical memory organisation.....	8
ANNA MIKA et al with ANDREW SMITH & METIN I. EREN – Hafted technologies likely reduced stone tool-related selective pressures acting on the hominin hand	8
Neuroscience and Biobehavioral Reviews	8
PAPERS.....	8
JEREMY I. SKIPPER – A voice without a mouth no more: The neurobiology of language and consciousness.....	8
New Scientist	9
NEWS	9
Theory of consciousness branded 'pseudoscience' by neuroscientists	9
Earliest evidence of buildings made from wood is 476,000 years old	9
ARTICLES.....	9
MICHAEL MARSHALL – The entire brain may be involved in language, not just a few regions.....	9
Proceedings of the Royal Society B.....	9
PAPERS.....	9
YITZCHAK BEN MOCHA et al – Evidence for a reproductive sharing continuum in cooperatively breeding mammals and birds: consequences for comparative research.....	9
R. HEINSOHN et al – Individual preferences for sound tool design in a parrot	9
SHIJIA HUA, ZITONG HUI & LINJIE LIU – Evolution of conditional cooperation in collective-risk social dilemma with repeated group interactions	10
Royal Society Open Science.....	10
PAPERS.....	10
ZOË GOLDSBOROUGH et al – Coupling of coastal activity with tidal cycles is stronger in tool-using capuchins (<i>Cebus capucinus imitator</i>)	10
MARIE J.M. VANHOOF et al – Principal component and linear discriminant analyses for the classification of hominoid primate specimens based on bone shape data.....	10
Science.....	10
NEWS	10
Half-million-year-old ‘Lincoln Logs’ may be first wood structure made by ancient humans	10
Science Advances.....	11
PAPERS.....	11
SANDRA OLIVEIRA et al – Genome-wide variation in the Angolan Namib Desert reveals unique pre-Bantu ancestry	11
MARCO VIDAL-CORDASCO et al – Neanderthal coexistence with <i>Homo sapiens</i> in Europe was affected by herbivore carrying capacity	11
Trends in Neurosciences	11
PAPERS.....	11
ANDREAS NIEDER – Neuroscience of cognitive control in crows.....	11
SUBSCRIBE to the EAORC Bulletin	11
UNSUBSCRIBE from the EAORC Bulletin	11
PRODUCED BY AND FOR THE EAORC EMAIL GROUP.....	11

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 – Neo-Pragmatism and Enactive Intentionality

In J. Schulkin (ed.), Action, Perception and the Brain. Palgrave-Macmillan, 117-146 (2012).

SHAUN GALLAGHER & KATSUNORI MIYAHARA – Neo-Pragmatism and Enactive Intentionality

In this chapter we address the following question: can enactive and extended conceptions of the mind agree on a model of intentionality? We explore several conceptions of intentionality in order to ask which one best supports the concept of mind implied by both the enactive and the extended views. We argue (1) that, although both enactive and extended views champion a non-Cartesian, noninternalist conception of mind, we only start to see what this conception of mind is when we adopt an enactivist conception of intentionality; (2) only by adopting this model of intentionality will the proponents of the extended mind hypothesis be able to fend off those critics who insist on defining the “mark of the mental” in terms of nonderivative (narrow or internal) content; and (3) working out this model of intentionality requires resolutions to a number of debates in the area of social cognition.

https://www.academia.edu/106417138/Gallagher_S_and_Miyahara_K_2012_Neo_Pragmatism_and_Enactive_Intentionality

NEWS**GUARDIAN SCIENCE – Justice for Neanderthals! What the debate about our long-dead cousins reveals**

They were long derided as knuckle-draggers, but new discoveries are setting the record straight. As we rethink the nature of the Neanderthals, we could also learn something about our own humanity.

<https://www.theguardian.com/science/2023/sep/19/justice-for-neanderthals-what-the-debate-about-our-long-dead-cousins-reveals-about-us>

NATURE BRIEFING – Jawbone hints at new human species

A 300,000-year-old jawbone discovered in a cave in eastern China could represent a new branch of the human family tree. The bone bears a curious mix of modern and archaic features: it's thick along the jawline, a feature shared with early human species, and lacks the true chin of Homo sapiens. But the side of the mandible is more reminiscent of that of modern humans. The finding deepens the mystery of which ancient human species inhabited East Asia during the Pleistocene, and whether any of them could be ancestors of modern humans.

<https://www.nature.com/articles/d41586-023-02924-8>

NATURE BRIEFING – These logs could be earliest wood structure

The remains of what might have been a wooden structure built by hominins roughly half a million years ago have been uncovered in Zambia. Researchers can't definitively identify the possible structure — it might have been a raised platform, a shelter or something else entirely. Whatever it was, it pre-dates the evolution of Homo sapiens by more than 100,000 years.

<https://www.nature.com/articles/d41586-023-02928-4>

NATURE BRIEFING – Consciousness theory 'is pseudoscience'

A letter signed by 124 researchers claims that a prominent theory about consciousness — integrated information theory (IIT) — is “pseudoscience” because it cannot be empirically tested. In June, neuroscientist Christof Koch and philosopher David Chalmers announced the results of an experiment that pitted IIT against another consciousness theory. Neither won, exactly — but the debate still gave the theory undue attention, according to some critics. Others call the ‘pseudoscience’ term inflammatory. “The most important thing for me is that we don't make our hypotheses small and banal in order to avoid being tarred with the pseudoscience label,” says neuroscientist Erik Hoel.

<https://www.nature.com/articles/d41586-023-02971-1>

SAPIENS – Will the Iconic Skull of an Ancient Human Return to Zambia?

The United Kingdom has agreed to negotiate the possible relocation of the Kabwe skull. If the move occurs, it would be a triumph for repatriation efforts.

<https://www.sapiens.org/biology/repatriation-kabwe-skull/>

SCIENCEADVISER – Structure found near Kalambo Falls in Zambia likely crafted by archaic human relatives

When archaeologists unearthed a large wooden structure from the banks of the Kalambo River, they were amazed to find it was almost half a million years old—and how much it resembled a set of Lincoln Logs, considering it was made by ancient human relatives.

<https://www.science.org/content/article/half-million-year-old-lincoln-logs-may-be-first-wood-structure-made-by-ancient-humans>

SCIENCE.ORG NEWS – 500ky-old 'Lincoln Logs' may be wood structure made by ancient humans

Interlocking timber unearthed in Zambia may have been part of a platform, bridge, or house foundation.

<https://www.science.org/content/article/half-million-year-old-lincoln-logs-may-be-first-wood-structure-made-by-ancient-humans>

SCIENCE.ORG NEWS – Ancient Amazonians created mysterious ‘dark earth’ on purpose

Soil study suggests today’s Indigenous Amazonians are making new terra preta.

<https://www.science.org/content/article/ancient-amazonians-created-mysterious-dark-earth-purpose>

PUBLICATIONS

eLife

PAPERS

MICHAEL KLEINMAN et al – A cortical information bottleneck during decision-making

Decision-making emerges from distributed computations across multiple brain areas, but it is unclear why the brain distributes the computation. In deep learning, artificial neural networks use multiple areas (or layers) to form optimal representations of task inputs. These optimal representations are sufficient to perform the task well, but minimal so they are invariant to other irrelevant variables. We recorded single neurons and multiunits in dorsolateral prefrontal cortex (DLPFC) and dorsal premotor cortex (PMd) in monkeys during a perceptual decision-making task. We found that while DLPFC represents task-related inputs required to compute the choice, the downstream PMd contains a minimal sufficient, or optimal, representation of the choice. To identify a mechanism for how cortex may form these optimal representations, we trained a multi-area recurrent neural network (RNN) to perform the task. Remarkably, DLPFC and PMd resembling representations emerged in the early and late areas of the multi-area RNN, respectively. The DLPFC-resembling area partially orthogonalized choice information and task inputs and this choice information was preferentially propagated to downstream areas through selective alignment with inter-area connections, while remaining task information was not. Our results suggest that cortex uses multi-area computation to form minimal sufficient representations by preferential propagation of relevant information between areas.

<https://elifesciences.org/reviewed-preprints/89369>

AMÉLIE BEAUDET & EDWIN DE JAGER – Broca’s area, variation and taxic diversity in early Homo from Koobi Fora (Kenya)

Because brain tissues rarely fossilize, pinpointing when and how modern human cerebral traits emerged in the hominin lineage is particularly challenging. The fragmentary nature of the fossil material, coupled with the difficulty of characterizing such a complex organ, has been the source of long-standing debates. Prominent among them are the uncertainties around the derived or primitive state of the brain organization in the earliest representatives of the genus Homo, more particularly in key regions such as the Broca’s area. By revisiting a particularly well-preserved fossil endocast from the Turkana basin (Kenya), here we confirm that early Homo in Africa had a primitive organization of the Broca’s area ca. 1.9 million years ago. Additionally, our description of KNM-ER 3732 adds further information about the variation pattern of the inferior frontal gyrus in fossil hominins, with implications for early Homo taxic diversity (i.e. one or two Homo species at Koobi Fora) and the nature of the mechanisms involved in the emergence of derived cerebral traits.

<https://elifesciences.org/articles/89054>

Frontiers in Earth Science

PAPERS

JUAN I. MORALES et al – A new assemblage of late Neanderthal remains from Cova Simanya (NE Iberia)

This study presents an exceptional collection of 54 Late Pleistocene human remains that correspond to at least three Neanderthal individuals from Simanya Gran, the main gallery of Cova Simanya, located in the northeastern Iberian Peninsula. The collection comprised 53 unpublished remains that were unearthed during the 1970s and an additional tooth discovered during 2021 excavations. The specimens represent an adult with a small stature, a periadolescent aged approximately 11.5 years, and an immature individual aged approximately 7.7 years, thus offering a more complete demographic perspective. The collection encompasses diverse anatomical parts including upper and lower dentition, mandible, vertebrae, and limb bones from both the upper and lower extremities. Attempts to extract aDNA were unsuccessful. Renewed archaeological investigations at Cova Simanya have facilitated the reevaluation of the original stratigraphic context of these remains, leading to the discovery of the additional tooth, aligning with the periadolescent individual. This assemblage is currently the most extensive Neanderthal collection from the northeastern Mediterranean Iberia, offering invaluable insights into the morphology and evolutionary trajectory of Late Pleistocene hominins. Hence, Simanya Neanderthals will enhance our understanding of Neanderthal demographics and evolution, paving the way for an in-depth examination of the morphological diversity and evolutionary context of Iberian Neanderthals.

<https://www.frontiersin.org/articles/10.3389/feart.2023.1230707/full>

Frontiers in Psychology

PAPERS

ANETT RAGÓ, ZSUZSANNA VARGA & MIKLOS SZABO – Stable organization of the early lexical-semantic network in 18- and 24-month-old preterm and full-term infants: an eye-tracker study

An organized mental lexicon determines new information acquisition by orienting attention during language processing. Adult-like lexical-semantic knowledge organization has already been demonstrated in 24-month-olds. However, the outcomes of earlier studies have been contradictory in terms of the organizational capacities of 18-month-olds, thus our aim was to examine lexical-semantic organization in this younger age group. In prematurely born infants, audiovisual integration deficits have been found alongside disruptions in language perception. By including late preterm infants with corrected ages in our study, we aimed to test whether maturational differences influence lexical-semantic organization when vocabulary is growing rapidly.

We tested 47 late preterm and full-term 18- and 24-month-old infants by means of an infant-adapted target-absent task using a slightly modified version of the original visual world paradigm for eye tracker.

We found a longer fixation duration for the lexical and semantic distractors compared to the neutral pictures. Neither language proficiency nor age affected the looking time results. We found a dissociation by age between taxonomic and associative semantic relations. Maturational differences were detectable in the initial processing of taxonomic relations, as processing in the preterm group was slightly delayed and qualitatively different in the first half of the looking time. The size and composition of the expressive vocabulary differed only by age.

In general, our study demonstrated a stable lexical-semantic organization between 18 and 24 months of age, regardless of maturational differences.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1194770/full>

Heliyon

PAPERS

ALEXANDER KRAUSS – Homo methodologicus and the origin of science and civilisation

Few things have impacted our lives as much as science and technology, but how we developed science and civilisation is one of the most challenging questions that has not yet been well explained. Attempting to identify the central driver, leading scientists have highlighted the role of culture, cooperation and geography. They focus thus on broad factors that are important basic preconditions but that we cannot directly influence. To better address the question, this paper integrates evidence from evolutionary biology, cognitive science, methodology, archaeology and anthropology. The paper identifies 9 main preconditions necessary for contemporary science, which include 6 main preconditions for civilisation. Using a kind of quasi-experimental research design we observe that some cultures (experimental groups) met the preconditions while other cultures (control groups) did not. Among the preconditions, we explain how our mind's evolved methodological abilities (to observe, solve problems and experiment) have directly enabled acquiring knowledge about the world and collectively developing increasingly sophisticated methods (such as mathematics and more systematic experimentation) that have enabled science and civilisation. We have driven the major revolutions throughout our history – the palaeolithic technological and agricultural revolutions and later the so-called scientific, industrial and digital revolutions – by using our methodological abilities in new ways and developing new methods and tools, i.e. through methodological revolutions. Viewing our methods as the main mechanism through which we have directly developed scientific and technological knowledge, and thus science and civilisation, provides a new framework for understanding science and the history of science. Viewing humans as homo methodologicus, using an expanding methodological toolbox, provides a nuanced explanation of how we have been directly able to meet our needs, solve problems and develop vast bodies of technological and scientific knowledge. By better understanding the origin and foundations of science, we can better understand their limits and, most importantly, how to push those limits. We can do so especially by addressing the evolved cognitive constraints and biases we face and improving the methods we use.

[https://www.cell.com/heliyon/fulltext/S2405-8440\(23\)07445-5](https://www.cell.com/heliyon/fulltext/S2405-8440(23)07445-5)

Linguistic Anthropology

PAPERS

CHARLES H.P. ZUCKERMAN & N.J. ENFIELD – The limits of thematization

A fundamental capacity of language is its reflexivity. But not every aspect of language is equally accessible to being reflected upon. Michael Silverstein's 1981 paper, the "Limits of Awareness," set the terms of this discussion in linguistic anthropology with his study of speakers' "awareness" of pragmatic forms and their corresponding capacity to talk about them. His notion of differential "awareness" of aspects of language has since been foundational to linguistic-anthropological understandings of language ideologies. Here we consider Silverstein's argument with reference to our research in Laos, exploring the limits of metalinguistic discourse. We argue that the apparent constraints on our capacity to talk about aspects of language do not evidence limits of awareness of elements of language, but rather constraints on our ability to thematize those elements, that is, to bring them into joint attention. The central issue is thematization, and the relation of interest is a relation of joint attention between speakers. Metalanguage is thus constrained not (only) by psychological limits but by the social and

semiotic limits on what people can bring into mutual focus within interactions. To present our framing of the issue and show what it helps us see, we distinguish two kinds of thematization and describe their subtypes, affordances, and constraints. We then demonstrate how social conventions—broadly understood—can circumvent these constraints, allowing people to thematize otherwise difficult to thematize forms.

<https://anthrosource.onlinelibrary.wiley.com/doi/abs/10.1111/jola.12399>

Nature

NEWS

Consciousness theory slammed as ‘pseudoscience’ — sparking uproar

Researchers publicly call out theory that they say is not well supported by science, but that gets undue attention.

<https://www.nature.com/articles/d41586-023-02971-1>

These ancient whittled logs could be the earliest known wooden structure

Stacked timbers dated to roughly 476,000 years ago show that ancient hominins worked with wood.

<https://www.nature.com/articles/d41586-023-02928-4>

A new human species? Mystery surrounds 300,000-year-old fossil

A chinless jawbone from eastern China that displays both modern and archaic features could represent a new branch of the human family tree.

<https://www.nature.com/articles/d41586-023-02924-8>

ARTICLES

ANNEMIEKE MILKS – Hominins built with wood 476,000 years ago

Understanding the timeline of technological developments sheds light on early societies. A remarkable finding in Africa of a structure made from shaped wood provides clues about our hominin relatives.

<https://www.nature.com/articles/d41586-023-02858-1>

PAPERS

L. BARHAM et al – Evidence for the earliest structural use of wood at least 476,000 years ago

Wood artefacts rarely survive from the Early Stone Age since they require exceptional conditions for preservation; consequently, we have limited information about when and how hominins used this basic raw material. We report here on the earliest evidence for structural use of wood in the archaeological record. Waterlogged deposits at the archaeological site of Kalambo Falls, Zambia, dated by luminescence to at least 476 ± 23 kyr ago (ka), preserved two interlocking logs joined transversely by an intentionally cut notch. This construction has no known parallels in the African or Eurasian Palaeolithic. The earliest known wood artefact is a fragment of polished plank from the Acheulean site of Gesher Benot Ya'aqov, Israel, more than 780 ka. Wooden tools for foraging and hunting appear 400 ka in Europe, China and possibly Africa. At Kalambo we also recovered four wood tools from 390 ka to 324 ka, including a wedge, digging stick, cut log and notched branch. The finds show an unexpected early diversity of forms and the capacity to shape tree trunks into large combined structures. These new data not only extend the age range of woodworking in Africa but expand our understanding of the technical cognition of early hominins, forcing re-examination of the use of trees in the history of technology.

<https://www.nature.com/articles/s41586-023-06557-9>

Nature Human Behaviour

ARTICLES

Large-scale AI language systems display an emergent ability to reason by analogy

Analogical reasoning is a hallmark of human intelligence, as it enables us to flexibly solve new problems without extensive practice. By using a wide range of tests, we demonstrate that GPT-3, a large-scale artificial intelligence language model, is capable of solving difficult analogy problems at a level comparable to human performance.

<https://www.nature.com/articles/s41562-023-01671-0>

PAPERS

TAYLOR WEBB, KEITH J. HOLYOAK & HONGJING LU – Emergent analogical reasoning in large language models

The recent advent of large language models has reinvigorated debate over whether human cognitive capacities might emerge in such generic models given sufficient training data. Of particular interest is the ability of these models to reason about novel problems zero-shot, without any direct training. In human cognition, this capacity is closely tied to an ability to reason by analogy. Here we performed a direct comparison between human reasoners and a large language model (the text-davinci-003 variant of Generative Pre-trained Transformer (GPT)-3) on a range of analogical tasks, including a non-visual matrix reasoning task based on the rule structure of Raven's Standard Progressive Matrices. We found that GPT-3 displayed a surprisingly strong capacity for abstract pattern induction, matching or even surpassing human capabilities in most settings;

preliminary tests of GPT-4 indicated even better performance. Our results indicate that large language models such as GPT-3 have acquired an emergent ability to find zero-shot solutions to a broad range of analogy problems.

<https://www.nature.com/articles/s41562-023-01659-w>

GUANGYAO ZHANG et al – A social-semantic working-memory account for two canonical language areas

Language and social cognition are traditionally studied as separate cognitive domains, yet accumulative studies reveal overlapping neural correlates at the left ventral temporoparietal junction (vTPJ) and the left lateral anterior temporal lobe (IATL), which have been attributed to sentence processing and social concept activation. We propose a common cognitive component underlying both effects: social-semantic working memory. We confirmed two key predictions of our hypothesis using functional MRI. First, the left vTPJ and IATL showed sensitivity to sentences only when the sentences conveyed social meaning; second, these regions showed persistent social-semantic-selective activity after the linguistic stimuli disappeared. We additionally found that both regions were sensitive to the socialness of non-linguistic stimuli and were more tightly connected with the social-semantic-processing areas than with the sentence-processing areas. The converging evidence indicates the social-semantic working-memory function of the left vTPJ and IATL and challenges the general-semantic and/or syntactic accounts for the neural activity of these regions.

<https://www.nature.com/articles/s41562-023-01704-8>

Nature Reviews Genetics

PAPERS

STÉPHANE PEYRÉGNE, VIVIANE SLON & JANET KELSO – More than a decade of genetic research on the Denisovans

Denisovans, a group of now extinct humans who lived in Eastern Eurasia in the Middle and Late Pleistocene, were first identified from DNA sequences just over a decade ago. Only ten fragmentary remains from two sites have been attributed to Denisovans based entirely on molecular information. Nevertheless, there has been great interest in using genetic data to understand Denisovans and their place in human history. From the reconstruction of a single high-quality genome, it has been possible to infer their population history, including events of admixture with other human groups. Additionally, the identification of Denisovan DNA in the genomes of present-day individuals has provided insights into the timing and routes of dispersal of ancient modern humans into Asia and Oceania, as well as the contributions of archaic DNA to the physiology of present-day people. In this Review, we synthesize more than a decade of research on Denisovans, reconcile controversies and summarize insights into their population history and phenotype. We also highlight how our growing knowledge about Denisovans has provided insights into our own evolutionary history.

<https://www.nature.com/articles/s41576-023-00643-4>

Nature Reviews Neuroscience

ARTICLES

KATHERINE WHALLEY – Restoring speech

For those affected by disorders or injuries that impair speech, technologies that can accurately and rapidly decode brain activity to facilitate natural communication could be transformative. Two papers now report the development of brain–computer interfaces that enable speech to be decoded from cortical activity with previously unreachable levels of precision and speed.

<https://www.nature.com/articles/s41583-023-00746-1>

PAPERS

YU-TING TSENG et al – Defensive responses: behaviour, the brain and the body

Most animals live under constant threat from predators, and predation has been a major selective force in shaping animal behaviour. Nevertheless, defence responses against predatory threats need to be balanced against other adaptive behaviours such as foraging, mating and recovering from infection. This behavioural balance in ethologically relevant contexts requires adequate integration of internal and external signals in a complex interplay between the brain and the body. Despite this complexity, research has often considered defensive behaviour as entirely mediated by the brain processing threat-related information obtained via perception of the external environment. However, accumulating evidence suggests that the endocrine, immune, gastrointestinal and reproductive systems have important roles in modulating behavioural responses to threat. In this Review, we focus on how predatory threat defence responses are shaped by threat imminence and review the circuitry between subcortical brain regions involved in mediating defensive behaviours. Then, we discuss the intersection of peripheral systems involved in internal states related to infection, hunger and mating with the neurocircuits that underlie defence responses against predatory threat. Through this process, we aim to elucidate the interconnections between the brain and body as an integrated network that facilitates appropriate defensive responses to threat and to discuss the implications for future behavioural research.

<https://www.nature.com/articles/s41583-023-00736-3>

Nature Scientific Reports

PAPERS

KRISTEN E. LI et al – Age-related increases in right hemisphere support for prosodic processing in children

Language comprehension is a complex process involving an extensive brain network. Brain regions responsible for prosodic processing have been studied in adults; however, much less is known about the neural bases of prosodic processing in children. Using magnetoencephalography (MEG), we mapped regions supporting speech envelope tracking (a marker of prosodic processing) in 80 typically developing children, ages 4–18 years, completing a stories listening paradigm. Neuromagnetic signals coherent with the speech envelope were localized using dynamic imaging of coherent sources (DICS). Across the group, we observed coherence in bilateral perisylvian cortex. We observed age-related increases in coherence to the speech envelope in the right superior temporal gyrus ($r = 0.31$, $df = 78$, $p = 0.0047$) and primary auditory cortex ($r = 0.27$, $df = 78$, $p = 0.016$); age-related decreases in coherence to the speech envelope were observed in the left superior temporal gyrus ($r = -0.25$, $df = 78$, $p = 0.026$). This pattern may indicate a refinement of the networks responsible for prosodic processing during development, where language areas in the right hemisphere become increasingly specialized for prosodic processing. Altogether, these results reveal a distinct neurodevelopmental trajectory for the processing of prosodic cues, highlighting the presence of supportive language functions in the right hemisphere. Findings from this dataset of typically developing children may serve as a potential reference timeline for assessing children with neurodevelopmental hearing and speech disorders.

<https://www.nature.com/articles/s41598-023-43027-8>

FABIEN CARRERAS & CHRIS J. A. MOULIN – Evidence for a metacognitive awareness of autobiographical memory organisation

Models of autobiographical memory (AM) recall posit some form of control process, but the extent to which we can reflect on this form of retrieval is under-researched. Here we propose a method for measuring such metacognitive awareness in AM. Since the verification of personal facts is difficult, we based our design on AM organisation. AMs are proposed to be organised into a coherent life story, that is, a subjective chronology reflecting the goals of the individual over time. We investigated the metacognitive awareness of this coherence. Eighty-three participants generated AMs and made two judgements of order for pairs of memories and gave a confidence rating. We found that participants were indeed able to distinguish pairs of memories that were coherent with their life story chronology from pairs which were not. We also found a significant effect of response time and task difficulty on confidence, suggesting that judgement of order fluency was determinant for metacognitive evaluation. This suggests common properties between metacognitive abilities related to autobiographical memory and those related to other forms of memory.

<https://www.nature.com/articles/s41598-023-34389-0>

ANNA MIKA et al with ANDREW SMITH & METIN I. EREN – Hafted technologies likely reduced stone tool-related selective pressures acting on the hominin hand

The evolution of the hominin hand has been widely linked to the use and production of flaked stone tool technologies. After the earliest handheld flake tools emerged, shifts in hominin hand anatomy allowing for greater force during precision gripping and ease when manipulating objects in-hand are observed in the fossil record. Previous research has demonstrated how biometric traits, such as hand and digit lengths and precision grip strength, impact functional performance and ergonomic relationships when using flake and core technologies. These studies are consistent with the idea that evolutionary selective pressures would have favoured individuals better able to efficiently and effectively produce and use flaked stone tools. After the advent of composite technologies during the Middle Stone Age and Middle Palaeolithic, fossil evidence reveals differences in hand anatomy between populations, but there is minimal evidence for an increase in precision gripping capabilities. Furthermore, there is little research investigating the selective pressures, if any, impacting manual anatomy after the introduction of hafted composite stone technologies ('handles'). Here we investigated the possible influence of tool-user biometric variation on the functional performance of 420 hafted Clovis knife replicas. Our results suggest there to be no statistical relationships between biometric variables and cutting performance. Therefore, we argue that the advent of hafted stone technologies may have acted as a 'performance equaliser' within populations and removed (or reduced) selective pressures favouring forceful precision gripping capabilities, which in turn could have increased the relative importance of cultural evolutionary selective pressures in the determination of a stone tool's performance.

<https://www.nature.com/articles/s41598-023-42096-z>

Neuroscience and Biobehavioral Reviews

PAPERS

JEREMY I. SKIPPER – A voice without a mouth no more: The neurobiology of language and consciousness

Most research on the neurobiology of language ignores consciousness and vice versa. Here, language, with an emphasis on inner speech, is hypothesised to generate and sustain self-awareness, i.e., higher-order consciousness. Converging evidence supporting this hypothesis is reviewed. To account for these findings, a 'HOLISTIC' model of neurobiology of language, inner speech, and consciousness is proposed. It involves a 'core' set of inner speech production regions that initiate the experience

of feeling and hearing words. These take on affective qualities, deriving from activation of associated sensory, motor, and emotional representations, involving a largely unconscious dynamic 'periphery', distributed throughout the whole brain. Responding to those words forms the basis for sustained network activity, involving 'default mode' activation and prefrontal and thalamic/brainstem selection of contextually relevant responses. Evidence for the model is reviewed, supporting neuroimaging meta-analyses conducted, and comparisons with other theories of consciousness made. The HOLISTIC model constitutes a more parsimonious and complete account of the 'neural correlates of consciousness' that has implications for a mechanistic account of mental health and wellbeing.

<https://www.sciencedirect.com/science/article/pii/S0149763422002615>

New Scientist

NEWS

Theory of consciousness branded 'pseudoscience' by neuroscientists

Integrated information theory is seen by some people as a leading theory of consciousness, but now over 100 neuroscientists have signed an open letter calling it untestable pseudoscience.

<https://www.newscientist.com/article/2392771-theory-of-consciousness-branded-pseudoscience-by-neuroscientists/>

Earliest evidence of buildings made from wood is 476,000 years old

We tend to think that ancient humans were constantly on the move, but at a site in Zambia there are the first tentative hints that people stayed put and built large wooden dwellings.

<https://www.newscientist.com/article/2392894-earliest-evidence-of-buildings-made-from-wood-is-476000-years-old/>

ARTICLES

MICHAEL MARSHALL – The entire brain may be involved in language, not just a few regions

Brain regions identified as "language centres" are actually hubs that coordinate the processing of language throughout the brain, argues a controversial new study.

<https://www.newscientist.com/article/2393046-the-entire-brain-may-be-involved-in-language-not-just-a-few-regions/>

Proceedings of the Royal Society B

PAPERS

YITZCHAK BEN MOCHA et al – Evidence for a reproductive sharing continuum in cooperatively breeding mammals and birds: consequences for comparative research

Extreme reproductive skew occurs when a dominant female/male almost monopolizes reproduction within a group of multiple sexually mature females/males, respectively. It is sometimes considered an additional, restrictive criterion to define cooperative breeding. However, datasets that use this restrictive definition to classify species as cooperative breeders systematically overestimate reproductive skew by including groups in which reproduction cannot be shared by definition (e.g. groups with a single female/male). Here, we review the extent of reproductive sharing in 41 mammal and 37 bird species previously classified as exhibiting alloparental care and extreme reproductive skew, while only considering multi-female or multi-male groups. We demonstrate that in groups where unequal reproduction sharing is possible, extreme reproductive skew occurs in a few species only (11/41 mammal species and 12/37 bird species). These results call for significant changes in datasets that classify species' caring and mating system. To facilitate these changes, we provide an updated dataset on reproductive sharing in 63 cooperatively breeding species. At the conceptual level, our findings suggest that reproductive skew should not be a defining criterion of cooperative breeding and support the definition of cooperative breeding as a care system in which alloparents provide systematic care to other group members' offspring.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2023.0607>

R. HEINSOHN et al – Individual preferences for sound tool design in a parrot

The rarity of tool manufacture in wild parrots is surprising because they share key life-history traits with advanced tool-using species, including large brains, complex sociality and prolonged parental care. When it does occur, tool manufacture in parrots tends to be innovative, spontaneous and individually variable, but most cases have been in captivity. In the wild, only palm cockatoos (*Probosciger aterrimus*) have been observed using tools regularly. However, they are unusual because they use tools to enhance their displays rather than for foraging or self-maintenance. Males in northern Australia make two types of tool from sticks and seed pods, which they tap rhythmically against a tree during display. We analysed 256 sound tools retrieved from 70 display trees. Drumsticks (89% of tools) were used more often than seed pod tools; most males manufactured only drumsticks, but some made both types. Individual males differed significantly in the design of their drumsticks including the length, width and mass but we found no evidence that neighbours copied each other. We discuss the highly individualized preferences for sound tool design in context of the behavioural predispositions behind the rarity of tool manufacture in wild parrots.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2023.1271>

SHIJIA HUA, ZITONG HUI & LINJIE LIU – Evolution of conditional cooperation in collective-risk social dilemma with repeated group interactions

The evolution and long-term sustenance of cooperation has consistently piqued scholarly interest across the disciplines of evolutionary biology and social sciences. Previous theoretical and experimental studies on collective risk social dilemma games have revealed that the risk of collective failure will affect the evolution of cooperation. In the real world, individuals usually adjust their decisions based on environmental factors such as risk intensity and cooperation level. However, it is still not well understood how such conditional behaviours affect the evolution of cooperation in repeated group interactions scenario from a theoretical perspective. Here, we construct an evolutionary game model with repeated interactions, in which defectors decide whether to cooperate in subsequent rounds of the game based on whether the risk exceeds their tolerance threshold and whether the number of cooperators exceeds the collective goal in the early rounds of the game. We find that the introduction of conditional cooperation strategy can effectively promote the emergence of cooperation, especially when the risk is low. In addition, the risk threshold significantly affects the evolutionary outcomes, with a high risk promoting the emergence of cooperation. Importantly, when the risk of failure to reach collective goals exceeds a certain threshold, the timely transition from a defective strategy to a cooperative strategy by conditional cooperators is beneficial for maintaining high-level cooperation.

<https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2023.0949>

Royal Society Open Science**PAPERS****ZOË GOLDSBOROUGH et al – Coupling of coastal activity with tidal cycles is stronger in tool-using capuchins (*Cebus capucinus imitator*)**

Terrestrial mammals exploiting coastal resources must cope with the challenge that resource availability and accessibility fluctuate with tidal cycles. Tool use can improve foraging efficiency and provide access to structurally protected resources that are otherwise unavailable (e.g. molluscs and fruits). To understand how variable accessibility of valuable resources shapes behavioural patterns, and whether tool use aids in the efficient exploitation of intertidal resources, we compared the relationship between tidal cycles and activity patterns of tool-using versus non-tool-using groups of white-faced capuchin monkeys on Jicarón Island in Coiba National Park, Panama. Although tool use on Jicarón is localized to a small stretch of coast (approx. 1 km), all coastal groups forage on intertidal resources. Using more than 5 years of camera trap data at varying distances from the coast, we found that capuchins on Jicarón showed increased coastal activity during specific parts of the tidal cycle, and that this relationship differed between tool-using and non-tool-using groups, as well as between seasons. Activity patterns of tool-using capuchins were more strongly and consistently tied to tidal cycles compared with non-tool-users, indicating that tool use might allow for more efficient exploitation of tidal resources. Our findings highlight the potential of tool use to aid niche expansion.

<https://royalsocietypublishing.org/doi/10.1098/rsos.230355>

MARIE J.M. VANHOOF et al – Principal component and linear discriminant analyses for the classification of hominoid primate specimens based on bone shape data

In this study, we tested the hypothesis that machine learning methods can accurately classify extant primates based on triquetrum shape data. We then used this classification tool to observe the affinities between extant primates and fossil hominoids. We assessed the discrimination accuracy for an unsupervised and supervised learning pipeline, i.e. with principal component analysis (PCA) and linear discriminant analysis (LDA) feature extraction, when tasked with the classification of extant primates. The trained algorithm is used to classify a sample of known fossil hominoids. For the visualization, PCA and uniform manifold approximation and projection (UMAP) are used. The results show that the discriminant function correctly classified the extant specimens with an F1-score of 0.90 for both PCA and LDA. In addition, the classification of fossil hominoids reflects taxonomy and locomotor behaviour reported in literature. This classification based on shape data using PCA and LDA is a powerful tool that can discriminate between the triquetrum shape of extant primates with high accuracy and quantitatively compare fossil and extant morphology. It can be used to support taxonomic differentiation and aid the further interpretation of fossil remains. Further testing is necessary by including other bones and more species and specimens per species extinct primates.

<https://royalsocietypublishing.org/doi/10.1098/rsos.230950>

Science**NEWS****Half-million-year-old 'Lincoln Logs' may be first wood structure made by ancient humans**

Interlocking timber unearthed in Zambia may have been part of a platform, bridge, or house foundation

<https://www.science.org/content/article/half-million-year-old-lincoln-logs-may-be-first-wood-structure-made-by-ancient-humans>

Science Advances

PAPERS

SANDRA OLIVEIRA et al – Genome-wide variation in the Angolan Namib Desert reveals unique pre-Bantu ancestry

Ancient DNA studies reveal the genetic structure of Africa before the expansion of Bantu-speaking agriculturalists; however, the impact of now extinct hunter-gatherer and herder societies on the genetic makeup of present-day African groups remains elusive. Here, we uncover the genetic legacy of pre-Bantu populations from the Angolan Namib Desert, where we located small-scale groups associated with enigmatic forager traditions, as well as the last speakers of the Khoe-Kwadi family's Kwadi branch. By applying an ancestry decomposition approach to genome-wide data from these and other African populations, we reconstructed the fine-scale histories of contact emerging from the migration of Khoe-Kwadi-speaking pastoralists and identified a deeply divergent ancestry, which is exclusively shared between groups from the Angolan Namib and adjacent areas of Namibia. The unique genetic heritage of the Namib peoples shows how modern DNA research targeting understudied regions of high ethnolinguistic diversity can complement ancient DNA studies in probing the deep genetic structure of the African continent.

<https://www.science.org/doi/full/10.1126/sciadv.adh3822>

MARCO VIDAL-CORDASCO et al – Neanderthal coexistence with Homo sapiens in Europe was affected by herbivore carrying capacity

It has been proposed that climate change and the arrival of modern humans in Europe affected the disappearance of Neanderthals due to their impact on trophic resources; however, it has remained challenging to quantify the effect of these factors. By using Bayesian age models to derive the chronology of the European Middle to Upper Paleolithic transition, followed by a dynamic vegetation model that provides the Net Primary Productivity, and a macroecological model to compute herbivore abundance, we show that in continental regions where the ecosystem productivity was low or unstable, Neanderthals disappeared before or just after the arrival of Homo sapiens. In contrast, regions with high and stable productivity witnessed a prolonged coexistence between both species. The temporal overlap between Neanderthals and H. sapiens is significantly correlated with the carrying capacity of small- and medium-sized herbivores. These results suggest that herbivore abundance released the trophic pressure of the secondary consumers guild, which affected the coexistence likelihood between both human species.

<https://www.science.org/doi/full/10.1126/sciadv.adi4099>

Trends in Neurosciences

PAPERS

ANDREAS NIEDER – Neuroscience of cognitive control in crows

Crows, a group of corvid songbird species, show superb behavioral flexibility largely stemming from their advanced cognitive control functions. These functions mainly originate from the associative avian pallium that evolved independently from the mammalian cerebral cortex. This article presents a brief overview of cognitive control functions and their neuronal foundation in crows.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(23\)00162-5](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(23)00162-5)

SUBSCRIBE to the EAORC Bulletin

If you would like to subscribe to this free weekly newsletter, please contact martin.edwardes@btopenworld.com.

UNSUBSCRIBE from the EAORC Bulletin

Send an email to 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.