

EAORC BULLETIN 1,081 – 3 March 2024

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NOTICES

PUBLICATION ALERTS

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

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

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

EDITORIAL INTERJECTIONS

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

ACADEMIA.EDU – Opening the Door, Pointing the Way

Paléorient 37:1, 29-38 (2011).

T. WATKINS – Opening the Door, Pointing the Way

Naissance des divinités, Naissance de l'agriculture (1994) represented his mature and original thinking on the essential nature of neolithisation. While the book continues to influence the thought and work of many, its impact is diminished because Jacques Cauvin left two major questions unanswered. My own research has been directed to investigating those questions: Cauvin described his “révolution des symboles” as “psycho-cultural”, but he said little about its cognitive and cultural nature; and he repeated the question with which R. Braidwood had challenged us – to explain why (in Braidwood's case) hunter-gatherers had turned to farming at that particular time, and why not earlier. My work has been directed at developing an understanding of the cognitive and cultural implications of the use of systems of symbolic representation in material form; and at setting the emergence of those cognitive skills in the context of theories of the evolution of human cultural communication. However, we have made little progress along the way that Cauvin pointed us. Despite rapid and exciting strides in theories about the human mind and the cognitive evolution of human social and communication skills, inter-disciplinary collaboration with archaeologists has placed the climax of the story in the Upper Palaeolithic; the Neolithic has been either ignored or seen as no more than a consequence of a “human revolution” that was achieved more than 30,000 years ago. In order to progress, we need to form new inter-disciplinary collaborations that will investigate the cognitive and symbolic cultural aspects of the Neolithic.

https://www.academia.edu/1550080/Opening_the_door_pointing_the_way

ACADEMIA.EDU – The origins of modern human behavior

In Robert Bednarik (ed.), The Psychology of Human Behavior, Nova Science Publishers (2013).

ROBERT BEDNARIK – The origins of modern human behavior

To explain human behavior through its present-day manifestations is rather like considering illness through its symptoms instead of its causes. A psychology that explores human behavior purely by analyzing its observed extant expressions, without recourse to how or why these may have developed, lacks a scientific context, which demands causal explanations. In this chapter it is attempted to show that an etiology of human behavior would be achievable if Pleistocene archaeology and paleoanthropology were not in such a deplorable state of misinformation. Nevertheless, a rudimentary model of how and why hominin behavior patterns developed in the Pleistocene is presented here. In particular, “behavioral normality” is explored through the available empirical information and the rise of brain illnesses during the most recent history of our species. The establishment of self-awareness is considered, as well as the role of “theory of mind” in the development of behavioral patterns. Of relevance are also the advent of extra-cranial storage of symbolic and cultural meanings, and the development of constructs of reality in the cognitive evolution of hominins. In considering this etiological context of modern human behavior it is demonstrated that a judicious utilization of relevant data obtainable from the archaeological record can yield a realistic paradigm.

https://www.academia.edu/15019792/The_origins_of_modern_human_behavior

ACADEMIA.EDU – The archaeology of the social brain revisited

Adaptive Behavior 29:2 (Special Issue), 137-152 (2021).

ANNA M. BARONA – The archaeology of the social brain revisited: rethinking mind and material culture from a material engagement perspective

The social brain hypothesis (SBH) has played a prominent role in interpreting the relationship between human social, cognitive and technological evolution in archaeology and beyond. This article examines how the SBH has been applied to the Palaeolithic material record, and puts forward a critique of the approach. Informed by Material Engagement Theory (MET) and its understanding of material agency, it is argued that the SBH has an inherently cognitivist understanding of mind and matter at its core. This Cartesian basis has not been fully resolved by archaeological attempts to integrate the SBH with relational models of cognition. At the heart of the issue has been a lack of meaningful consideration of the cognitive agency of things and the evolutionary efficacy of material engagement. This article proposes MET as a useful starting point for rethinking future approaches to human social cognitive becoming in a way that appreciates the co-constitution of brains, bodies and worlds. It also suggests how MET may bridge archaeological and 4E approaches to reconsider concepts such as the ‘mental template’ and Theory of Mind.

https://www.academia.edu/43628036/The_archaeology_of_the_social_brain_revisited_rethinking_mind_and_material_culture_from_a_material_engagement_perspective

NEWS

NATURE BRIEFING – How humans lost their tails

Researchers have shown that humans and other apes carry a DNA insertion in a gene called TBXT that other primates with tails, such as monkeys, don't have. And mice carrying similar alterations to their genomes have short or absent tails. “They clearly show that this change contributes to tail loss. But it's not the only one,” says human geneticist Malte Spielmann. Apes

aren't the only primates without tails, suggesting that the trait evolved multiple times. "Probably, there are multiple ways of losing a tail during development. Our ancestors chose this way," says co-author Bo Xia.

<https://www.nature.com/articles/d41586-024-00610-x>

SCIENCEADVISER – How the ape lost its tail

So-called "jumping genes" may have done away with the tails in apes—and made us more prone to birth defects.

<https://www.science.org/content/article/jumping-gene-may-have-erased-tails-humans-and-other-apes-and-boosted-our-risk-birth>

THE CONVERSATION – Losing their tails provided our ape ancestors with an evolutionary advantage

Many evolutionary changes also come with costs.

<https://theconversation.com/losing-their-tails-provided-our-ape-ancestors-with-an-evolutionary-advantage-but-were-still-paying-the-price-224385>

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

SAMAR M. SYEDA et al with TRACY L. KIVELL – Cortical bone architecture of hominid intermediate phalanges reveals functional signals of locomotion and manipulation

Reconstruction of fossil hominin manual behaviors often relies on comparative analyses of extant hominid hands to understand the relationship between hand use and skeletal morphology. In this context, the intermediate phalanges remain understudied. Thus, here we investigate cortical bone morphology of the intermediate phalanges of extant hominids and compare it to the cortical structure of the proximal phalanges, to investigate the relationship between cortical bone structure and inferred loading during manual behaviors.

Using micro-CT data, we analyze cortical bone structure of the intermediate phalangeal shaft of digits 2–5 in *Pongo pygmaeus* (n = 6 individuals), *Gorilla gorilla* (n = 22), *Pan spp.* (n = 23), and *Homo sapiens* (n = 23). The R package *morphomap* is used to study cortical bone distribution, cortical thickness and cross-sectional properties within and across taxa.

Non-human great apes generally have thick cortical bone on the palmar shaft, with *Pongo* only having thick cortex on the peaks of the flexor sheath ridges, while African apes have thick cortex along the entire flexor sheath ridge and proximal to the trochlea. Humans are distinct in having thicker dorsal shaft cortex as well as thick cortex at the disto-palmar region of the shaft.

Variation in cortical bone distribution and properties of the intermediate phalanges is consistent with differences in locomotor and manipulative behaviors in extant great apes. Comparisons between the intermediate and proximal phalanges reveals similar patterns of cortical bone distribution within each taxon but with potentially greater load experienced by the proximal phalanges, even in knuckle-walking African apes. This study provides a comparative context for the reconstruction of habitual hand use in fossil hominins and hominids.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24902>

Antiquity

PAPERS

MATTIN AIESTARAN et al – A Vasconic inscription on a bronze hand: writing and ritual in the Iron Age Irulegi settlement in the Ebro Valley

Relatively few examples of Palaeohispanic writing have been recovered from the Vasconic territories of present-day Navarre, leading to the assumption that the Vascones were a pre-literate society. Here, the authors report on an inscription on a bronze hand recovered at the Iron Age site of Irulegi (Aranguren Valley, Navarre) in northern Spain. Its detailed linguistic analysis suggests that the script represents a graphic subsystem of Palaeohispanic that shares its roots with the modern Basque language and constitutes the first example of Vasconic epigraphy. The text inscribed on this artefact, which was found at the entrance of a domestic building, is interpreted as apotropaic, a token entreating good fortune.

<https://www.cambridge.org/core/journals/antiquity/article/vasconic-inscription-on-a-bronze-hand-writing-and-rituality-in-the-iron-age-irulegi-settlement-in-the-ebro-valley/645A15DF3D725F83D62F3D1FB5DF83EC>

Cell

PAPERS

YAFEI MAO et mul – Structurally divergent and recurrently mutated regions of primate genomes

We sequenced and assembled using multiple long-read sequencing technologies the genomes of chimpanzee, bonobo, gorilla, orangutan, gibbon, macaque, owl monkey, and marmoset. We identified 1,338,997 lineage-specific fixed structural variants (SVs) disrupting 1,561 protein-coding genes and 136,932 regulatory elements, including the most complete set of human-specific fixed differences. We estimate that 819.47 Mbp or ~27% of the genome has been affected by SVs across

primate evolution. We identify 1,607 structurally divergent regions wherein recurrent structural variation contributes to creating SV hotspots where genes are recurrently lost (e.g., CARD, C4, and OLAH gene families) and additional lineage-specific genes are generated (e.g., CKAP2, VPS36, ACBD7, and NEK5 paralogs), becoming targets of rapid chromosomal diversification and positive selection (e.g., RGPD gene family). High-fidelity long-read sequencing has made these dynamic regions of the genome accessible for sequence-level analyses within and between primate species.

[https://www.cell.com/cell/fulltext/S0092-8674\(24\)00121-1](https://www.cell.com/cell/fulltext/S0092-8674(24)00121-1)

E. ANDREW BENNETT & QIAOMEI FU – Ancient genomes and the evolutionary path of modern humans

Growing evidence from archaic and early modern human genomes brings new insights to the emergence of modern humans. We recount recent information collected from ancient DNA studies that inform us about the evolutionary pathway to modern humanity. These findings point to both individual- and population-level advantages underlying modern human expansion.

[https://www.cell.com/cell/fulltext/S0092-8674\(24\)00116-8](https://www.cell.com/cell/fulltext/S0092-8674(24)00116-8)

Cell Reports

PAPERS

YUMEI GONG et al – Neural correlates of novelty detection in the primary auditory cortex of behaving monkeys

The neural mechanisms underlying novelty detection are not well understood, especially in relation to behavior. Here, we present single-unit responses from the primary auditory cortex (A1) from two monkeys trained to detect deviant tones amid repetitive ones. Results show that monkeys can detect deviant sounds, and there is a strong correlation between late neuronal responses (250–350 ms after deviant onset) and the monkeys' perceptual decisions. The magnitude and timing of both neuronal and behavioral responses are increased by larger frequency differences between the deviant and standard tones and by increasing the number of standard tones preceding the deviant. This suggests that A1 neurons encode novelty detection in behaving monkeys, influenced by stimulus relevance and expectations. This study provides evidence supporting aspects of predictive coding in the sensory cortex.

[https://www.cell.com/cell-reports/fulltext/S2211-1247\(24\)00192-X](https://www.cell.com/cell-reports/fulltext/S2211-1247(24)00192-X)

THÉO DESBORDES, JEAN-RÉMI KING & STANISLAS DEHAENE – Tracking the neural codes for words and phrases during semantic composition, working-memory storage, and retrieval

The ability to compose successive words into a meaningful phrase is a characteristic feature of human cognition, yet its neural mechanisms remain incompletely understood. Here, we analyze the cortical mechanisms of semantic composition using magnetoencephalography (MEG) while participants read one-word, two-word, and five-word noun phrases and compared them with a subsequent image. Decoding of MEG signals revealed three processing stages. During phrase comprehension, the representation of individual words was sustained for a variable duration depending on phrasal context. During the delay period, the word code was replaced by a working-memory code whose activation increased with semantic complexity. Finally, the speed and accuracy of retrieval depended on semantic complexity and was faster for surface than for deep semantic properties. In conclusion, we propose that the brain initially encodes phrases using factorized dimensions for successive words but later compresses them in working memory and requires a period of decompression to access them.

[https://www.cell.com/cell-reports/fulltext/S2211-1247\(24\)00175-X](https://www.cell.com/cell-reports/fulltext/S2211-1247(24)00175-X)

Current Biology

PAPERS

EILEEN KOWLER – Vision and microsaccades: Time to pay attention!

Visual perception of exceedingly small and highly detailed spatial regions depends on coordinated patterns of small shifts of the line of sight ('microsaccades') aided by pre-saccadic shifts of spatial attention directed precisely to the intended target of the saccade.

[https://www.cell.com/current-biology/abstract/S0960-9822\(24\)00032-0](https://www.cell.com/current-biology/abstract/S0960-9822(24)00032-0)

eLife

PAPERS

LISA M. BAS et al – A neurocomputational account of the link between social perception and social action

People selectively help others based on perceptions of their merit or need. Here, we develop a neurocomputational account of how these social perceptions translate into social choice. Using a novel fMRI social perception task, we show that both merit and need perceptions recruited the brain's social inference network. A behavioral computational model identified two non-exclusive mechanisms underlying variance in social perceptions: a consistent tendency to perceive others as meritorious/needy (bias) and a propensity to sample and integrate normative evidence distinguishing high from low merit/need in other people (sensitivity). Variance in people's merit (but not need) bias and sensitivity independently predicted distinct aspects of altruism in a social choice task completed months later. An individual's merit bias predicted context-independent variance in people's overall other-regard during altruistic choice, biasing people towards prosocial

actions. An individual's merit sensitivity predicted context-sensitive discrimination in generosity towards high and low merit recipients by influencing other-regard and self-regard during altruistic decision-making. This context-sensitive perception-action link was associated with activation in the right temporoparietal junction. Together, these findings point towards stable, biologically based individual differences in perceptual processes related to abstract social concepts like merit, and suggest that these differences may have important behavioral implications for an individual's tendency toward favoritism or discrimination in social settings.

<https://elifesciences.org/reviewed-preprints/92539>

MUGE OZKER et al – Speech-induced suppression and vocal feedback sensitivity in human cortex

Across the animal kingdom, neural responses in the auditory cortex are suppressed during vocalization, and humans are no exception. A common hypothesis is that suppression increases sensitivity to auditory feedback, enabling the detection of vocalization errors. This hypothesis has been previously confirmed in non-human primates, however a direct link between auditory suppression and sensitivity in human speech monitoring remains elusive. To address this issue, we obtained intracranial electroencephalography (iEEG) recordings from 35 neurosurgical participants during speech production. We first characterized the detailed topography of auditory suppression, which varied across superior temporal gyrus (STG). Next, we performed a delayed auditory feedback (DAF) task to determine whether the suppressed sites were also sensitive to auditory feedback alterations. Indeed, overlapping sites showed enhanced responses to feedback, indicating sensitivity. Importantly, there was a strong correlation between the degree of auditory suppression and feedback sensitivity, suggesting suppression might be a key mechanism that underlies speech monitoring. Further, we found that when participants produced speech with simultaneous auditory feedback, posterior STG was selectively activated if participants were engaged in a DAF paradigm, suggesting that increased attentional load can modulate auditory feedback sensitivity.

<https://elifesciences.org/reviewed-preprints/94198>

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, based on experienced mismatch with a known target, plan the necessary changes to recover the target 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 singing 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 sensory feedback during 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>

Frontiers in Developmental Psychology

PAPERS

ALENA GALILEE et al – Ortho-semantic learning of novel words: an event-related potential study of grade 3 children

As children become independent readers, they regularly encounter new words whose meanings they must infer from context, and whose spellings must be learned for future recognition. The self-teaching hypothesis proposes orthographic learning skills are critical in the transition to fluent reading, while the lexical quality hypothesis further emphasizes the importance of semantics. Event-related potential (ERP) studies of reading development have focused on effects related to the N170 component—print tuning (letters vs. symbols) and lexical tuning (real words vs. consonant strings)—as well as the N400 reflecting semantic processing, but have not investigated the relationship of these components to word learning during independent reading.

In this study, children in grade 3 independently read short stories that introduced novel words, then completed a lexical decision task from which ERPs were derived.

Like real words, newly-learned novel words evoked a lexical tuning effect, indicating rapid establishment of orthographic representations. Both real and novel words elicited significantly smaller N400s than pseudowords, suggesting that semantic representations of the novel words were established. Further, N170 print tuning predicted accuracy on identifying the spellings of the novel words, while the N400 effect for novel words was associated with reading comprehension.

Exposure to novel words during self-directed reading rapidly establishes neural markers of orthographic and semantic processing. Furthermore, the ability to rapidly filter letter strings from symbols is predictive of orthographic learning, while rapid establishment of semantic representations of novel words is associated with stronger reading comprehension.

<https://www.frontiersin.org/articles/10.3389/fdpys.2024.1340383/full>

Frontiers in Language Sciences

PAPERS

VIVIANA HAASE – Disentangling inhibition and prediction in negation processing

Negation as a universal feature of human language is used effortlessly in everyday communication. However, experimental research has shown that the comprehension of negated sentences seems to require additional cognitive resources compared to affirmative sentences. Many studies investigating the processing of negation report longer reading and reaction times for negative compared to affirmative sentences and many studies report a Polarity by Truth interaction: false affirmative sentences lead to longer response times and larger N400 event-related potentials (ERPs) than true affirmative sentences, whereas the pattern is reversed for negative sentences where it is the true sentence that elicits longer reaction times and higher N400 ERPs compared to false negative sentences. These interactions have been discussed in the light of lexical associations, predictability, and the need to construct two subsequent mental representations. Furthermore, recent studies have shown that the comprehension of negated sentences seems to make use of neural resources that are typically involved in cognitive control and inhibitory mechanisms. As both processes have been associated with two different and temporally overlapping ERP components (the N400 and the P300), we focus on studies with high temporal resolution. We discuss linguistic aspects of negation, such as semantic similarity and contextual invariance of negation. We furthermore discuss the role of the verb as well as the position of the negative marker with respect to the verb, and their respective relevance for predictive and inhibitory mechanisms in negated sentences.

<https://www.frontiersin.org/articles/10.3389/flang.2024.1304613/full>

Frontiers in Psychology

PAPERS

STEVEN JAN – Song and dance: a memetic angle on the evolution of musicality and music via case studies of a musemplex in Saint-Saëns and ABBA

Applying the theory of memetics to music offers the prospect of reconciling general Darwinian principles with the style and structure of music. The nature of the units of cultural evolution in music—memes or, more specifically, musemes—can potentially shed light on the evolutionary processes and pressures attendant upon early-hominin musicality. That is, primarily conjunct, narrow-tessitura musemes (those conforming to Ratner's "singing style," and its instrumental assimilations) and primarily disjunct, wide-tessitura musemes (those conforming to Ratner's "brilliant style," and its vocal assimilations) appear to be the outcome of distinct cultural-evolutionary processes. Moreover, musemes in each category arguably acquire their fecundity (perceptual-cognitive salience, and thus transmissibility) by appealing to different music-underpinning brain and body subsystems. Given music's status as an embodied phenomenon, both singing-style and brilliant-style musemes recruit and evoke image schemata, but those in the former category draw primarily upon vocal images of line, direction and continuity; whereas those in the latter category draw primarily upon rhythmic impetus and energy. These two museme-categories may have been molded by distinct biological-evolutionary processes—the evolution of fine vocal control, and that of rhythmic synchronisation, respectively; and they might—via the process of memetic drive—have themselves acted as separate and distinct selection pressures on biological evolution, in order to optimize the environment for their replication. As a case-study of (primarily) singing-style musemes, this article argues that a passage from the love duet "Mon cœur s'ouvre à ta voix" from Camille Saint-Saëns' opera *Samson et Dalila* op. 47 (1877) is the cultural-evolutionary antecedent of the Introduction/Chorus/Outro material of ABBA's song "The Winner Takes It All." Discussion of their melodic and harmonic similarities supports a memetic link between elements of Saint-Saëns' duet and ABBA's song. These relationships of cultural transmission are argued to have been impelled by the fecundity of the shared musemes, which arises from the image-schematic and embodied effects of the implication-realisation structures (in Narmour's sense) that comprise them; and which is underwritten by the coevolution of musemes with vocal- and rhythmic-production mechanisms, and associated perceptual-cognitive schemata.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2023.1260262/full>

Nature

NEWS

How humans lost their tails — and why the discovery took 2.5 years to publish

An elegant run of experiments in mice reveals the genetic changes that led humanity's ape ancestors to lose the appendage.

<https://www.nature.com/articles/d41586-024-00610-x>

ARTICLES

MIRIAM K. KONKEL & EMILY L. CASANOVA – A mobile DNA sequence could explain tail loss in humans and apes

The lack of a tail is one thing that separates apes — including humans — from other primates. Insertion of a short DNA sequence into a gene that controls tail development could explain tail loss in the common ancestor of apes.

https://www.nature.com/articles/d41586-024-00309-z?WT.ec_id=NATURE-20240229

MCKENZIE PRILLAMAN – Is ChatGPT making scientists hyper-productive? The highs and lows of using AI

Large language models are transforming scientific writing and publishing. But the productivity boost that these tools bring could come with a downside.

<https://www.nature.com/articles/d41586-024-00592-w>

INNA MAKHOVYCH – ‘Education is possible in any situation’ – what I’ve learnt from teaching in Kyiv amid a war

Ukraine’s universities have adapted by blending innovative forms of remote learning. Lessons from this experiment are relevant to the rest of the world.

<https://www.nature.com/articles/d41586-024-00588-6>

PAPERS**BO XIA et al – On the genetic basis of tail-loss evolution in humans and apes**

The loss of the tail is among the most notable anatomical changes to have occurred along the evolutionary lineage leading to humans and to the ‘anthropomorphous apes’, with a proposed role in contributing to human bipedalism. Yet, the genetic mechanism that facilitated tail-loss evolution in hominoids remains unknown. Here we present evidence that an individual insertion of an Alu element in the genome of the hominoid ancestor may have contributed to tail-loss evolution. We demonstrate that this Alu element—inserted into an intron of the TBXT gene—pairs with a neighbouring ancestral Alu element encoded in the reverse genomic orientation and leads to a hominoid-specific alternative splicing event. To study the effect of this splicing event, we generated multiple mouse models that express both full-length and exon-skipped isoforms of Tbx1, mimicking the expression pattern of its hominoid orthologue TBXT. Mice expressing both Tbx1 isoforms exhibit a complete absence of the tail or a shortened tail depending on the relative abundance of Tbx1 isoforms expressed at the embryonic tail bud. These results support the notion that the exon-skipped transcript is sufficient to induce a tail-loss phenotype. Moreover, mice expressing the exon-skipped Tbx1 isoform develop neural tube defects, a condition that affects approximately 1 in 1,000 neonates in humans¹⁰. Thus, tail-loss evolution may have been associated with an adaptive cost of the potential for neural tube defects, which continue to affect human health today.

<https://www.nature.com/articles/s41586-024-07095-8>

OBITUARIES**KATHELIJNE KOOPS & RICHARD WRANGHAM – Christophe Boesch (1951–2024), primatologist and champion of chimps**

Zoologist whose understanding of chimpanzee behaviours has helped to assure their survival.

<https://www.nature.com/articles/d41586-024-00638-z>

Nature Human Behaviour**NEWS****Differences between male and female height in Early Neolithic Europe are likely to have been driven by culture**

Using a large dataset of individuals from Early Neolithic Europe, we analysed DNA, diet and pathology to determine which factors most affected skeletal height. We found that the male–female height differences in north-central Europe were exceptionally large, and that the short stature of female individuals in this region possibly reflects a cultural preference to support male individuals. By contrast, in the Mediterranean, it is male individuals who were short, probably as a consequence of environmental stress.

<https://www.nature.com/articles/s41562-023-01754-y>

PAPERS**SAMANTHA L. COX et al – Socio-cultural practices may have affected sex differences in stature in Early Neolithic Europe**

The rules and structure of human culture impact health as much as genetics or environment. To study these relationships, we combine ancient DNA (n = 230), skeletal metrics (n = 391), palaeopathology (n = 606) and dietary stable isotopes (n = 873) to analyse stature variation in Early Neolithic Europeans from North Central, South Central, Balkan and Mediterranean regions. In North Central Europe, stable isotopes and linear enamel hypoplasias indicate high environmental stress across sexes, but female stature is low, despite polygenic scores identical to males, and suggests that cultural factors preferentially supported male recovery from stress. In Mediterranean populations, sexual dimorphism is reduced, indicating male vulnerability to stress and no strong cultural preference for males. Our analysis indicates that biological effects of sex-specific inequities can be linked to cultural influences at least as early as 7,000 yr ago, and culture, more than environment or genetics, drove height disparities in Early Neolithic Europe.

<https://www.nature.com/articles/s41562-023-01756-w>

JOHN PROTZKO et al with JAMES E. PUSTEJOVSKY – High replicability of newly discovered social-behavioural findings is achievable

[11 December 2023 NHB Editor's Note: Readers are alerted that this paper is subject to criticisms that are being considered by the editors. The criticisms relate to the preregistration and corresponding reporting of hypotheses, predictions, and analyses. We are investigating the concerns raised and an editorial response will follow the resolution of these issues.]

Failures to replicate evidence of new discoveries have forced scientists to ask whether this unreliability is due to suboptimal implementation of methods or whether presumptively optimal methods are not, in fact, optimal. This paper reports an investigation by four coordinated laboratories of the prospective replicability of 16 novel experimental findings using rigour-enhancing practices: confirmatory tests, large sample sizes, preregistration and methodological transparency. In contrast to past systematic replication efforts that reported replication rates averaging 50%, replication attempts here produced the expected effects with significance testing ($P < 0.05$) in 86% of attempts, slightly exceeding the maximum expected replicability based on observed effect sizes and sample sizes. When one lab attempted to replicate an effect discovered by another lab, the effect size in the replications was 97% that in the original study. This high replication rate justifies confidence in rigour-enhancing methods to increase the replicability of new discoveries.

<https://www.nature.com/articles/s41562-023-01749-9>

Nature Humanities & Social Sciences Communications

PAPERS

MENGZHU YAN & XUE WU – Prosody in linguistic journals: a bibliometric analysis

The present study provides a systematic review of prosody research in linguistic journals through a bibliometric analysis. Using the bibliographic data from 2001 to 2021 in key linguistic journals that publish prosody-related research, this study adopted co-citation analysis and keyword analysis to investigate the state of the intellectual structure and the emerging trends of research on prosody in linguistics over the past 21 years. Additionally, this study identified the highly cited authors, articles and journals in the field of prosody. The results offer a better understanding of how research in this area has evolved and where the boundaries of prosody research might be pushed in the future.

<https://www.nature.com/articles/s41599-024-02825-9>

JIE ZENG & JIANBU YANG – English language hegemony: retrospect and prospect

This paper explores the ascent of English as a global lingua franca within the context of linguistic hegemony, following Phillipson's 1992 framework. It scrutinizes English's role in the rapidly globalizing world, emphasizing its dominance across economic, governance, and scientific sectors and its impact on non-native English-speaking countries. Utilizing a sociolinguistic approach, combined with historical and interdisciplinary analysis, the study evaluates the influence of English hegemony in cultural, educational, and technological domains, with a focus on post-colonial and expanding circle nations. Additionally, the paper provides critical insights for developing language policies in these areas, considering the intricate role of English in the global linguistic landscape. It concludes by considering the prospects of English language hegemony.

<https://www.nature.com/articles/s41599-024-02821-z>

Nature Scientific Reports

PAPERS

SONGYUAN TAN et al – A randomised controlled trial investigating the causal role of the medial prefrontal cortex in mediating self-agency during speech monitoring and reality monitoring

Self-agency is the awareness of being the agent of one's own thoughts and actions. Self-agency is essential for interacting with the outside world (reality-monitoring). The medial prefrontal cortex (mPFC) is thought to be one neural correlate of self-agency. We investigated whether mPFC activity can causally modulate self-agency on two different tasks of speech-monitoring and reality-monitoring. The experience of self-agency is thought to result from making reliable predictions about the expected outcomes of one's own actions. This self-prediction ability is necessary for the encoding and memory retrieval of one's own thoughts during reality-monitoring to enable accurate judgments of self-agency. This self-prediction ability is also necessary for speech-monitoring where speakers consistently compare auditory feedback (what we hear ourselves say) with what we expect to hear while speaking. In this study, 30 healthy participants are assigned to either 10 Hz repetitive transcranial magnetic stimulation (rTMS) to enhance mPFC excitability ($N = 15$) or 10 Hz rTMS targeting a distal temporoparietal site ($N = 15$). High-frequency rTMS to mPFC enhanced self-predictions during speech-monitoring that predicted improved self-agency judgments during reality-monitoring. This is the first study to provide robust evidence for mPFC underlying a causal role in self-agency, that results from the fundamental ability of improving self-predictions across two different tasks.

<https://www.nature.com/articles/s41598-024-55275-3>

New Scientist

NEWS

ADHD may have evolved to help foragers know when to cut their losses

Symptoms of attention deficit hyperactivity disorder, such as impulsivity, may have helped foragers in hunter-gatherer communities quickly move on to new areas when food sources were low

<https://www.newscientist.com/article/2418114-adhd-may-have-evolved-to-help-foragers-know-when-to-cut-their-losses/>

Humpback whales have a specialised larynx for underwater singing

The distinctive melodies of baleen whales are produced by pushing air against a fatty cushion on one side of the larynx, and a sac lets them recycle air back into the lungs.

<https://www.newscientist.com/article/2418374-humpback-whales-have-a-specialised-larynx-for-underwater-singing/>

We finally know why live music makes us so emotional

Hearing live music tugs at our heartstrings more than a recording, probably because it increases activity in an emotion-processing region in our brain.

<https://www.newscientist.com/article/2419061-we-finally-know-why-live-music-makes-us-so-emotional/>

PLoS Biology

PAPERS

POOJA VISWANATHAN, ANNA M. STEIN & ANDREAS NIEDER – Sequential neuronal processing of number values, abstract decision, and action in the primate prefrontal cortex

Decision-making requires processing of sensory information, comparing the gathered evidence to make a judgment, and performing the action to communicate it. How neuronal representations transform during this cascade of representations remains a matter of debate. Here, we studied the succession of neuronal representations in the primate prefrontal cortex (PFC). We trained monkeys to judge whether a pair of sequentially presented displays had the same number of items. We used a combination of single neuron and population-level analyses and discovered a sequential transformation of represented information with trial progression. While numerical values were initially represented with high precision and in conjunction with detailed information such as order, the decision was encoded in a low-dimensional subspace of neural activity. This decision encoding was invariant to both retrospective numerical values and prospective motor plans, representing only the binary judgment of “same number” versus “different number,” thus facilitating the generalization of decisions to novel number pairs. We conclude that this transformation of neuronal codes within the prefrontal cortex supports cognitive flexibility and generalizability of decisions to new conditions.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002520>

PLoS One

PAPERS

CARLOS ROJAS et al – Word or pseudoword? The lexicality effect in naming and lexical decision tasks during advanced aging

Although there is evidence that recognizing pseudowords is more difficult than recognizing words during childhood, adulthood, and early old age (60–75 years), it is not yet clear what happens during advanced aging or the fourth age, a stage when the decline of fluid intelligence strongly affects processing speed, but a good performance of crystallized intelligence is described through an increase in vocabulary and knowledge. The objective of this study was to determine the lexicality effect in advanced aging, specifically exploring how the ability to recognize words and pseudowords (ortho-phonologically plausible for Spanish) is affected during the third and fourth-ages. The lexicality effect was measured using naming and lexical decision tasks. Response time and accuracy were compared between a fourth-age group (80+ years) and two third-age groups (60–69 and 70–79 years) through linear regression models. The results showed that, in general, the fourth-age group had longer response times and reduced accuracy when recognizing words and pseudowords. Moreover, they showed a significant lexicality effect (which increases from the third- age onwards), reflected in higher costs during pseudoword recognition, especially when the task required more cognitive effort (lexical decision task). These results were consistent with the impact of the deterioration of fluid intelligence on the speed of lexical recognition and with the better performance that crystallized intelligence can generate on accuracy, especially in the early stages of old age. Additionally, this study supports the fact that pseudoword recognition resists cognitive decline, as accentuated deterioration is visualized only after 80 years.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0299266>

Royal Society Open Science

PAPERS

VALÉRIA ROMANO et al – The role of social attraction and social avoidance in shaping modular networks

How interactions between individuals contribute to the emergence of complex societies is a major question in behavioural ecology. Nonetheless, little remains known about the type of immediate social structure (i.e. social network) that emerges from relationships that maximize beneficial interactions (e.g. social attraction towards informed individuals) and minimize costly relationships (e.g. social avoidance of infected group mates). We developed an agent-based model where individuals vary in the degree to which individuals signal benefits versus costs to others and, on this basis, choose with whom to interact depending on simple rules of social attraction (e.g. access to the highest benefits) and social avoidance (e.g. avoiding the highest costs). Our main findings demonstrate that the accumulation of individual decisions to avoid interactions with highly costly individuals, but that are to some extent homogeneously beneficial, leads to more modular networks. On the contrary, individuals favouring interactions with highly beneficial individuals, but that are to some extent homogeneously costly, lead to less modular networks. Interestingly, statistical models also indicate that when individuals have multiple potentially beneficial partners to interact with, and no interaction cost exists, this also leads to more modular networks. Yet, the degree of modularity is contingent upon the variability in benefit levels held by individuals. We discuss the emergence of modularity in the systems and their consequences for understanding social trade-offs.

<https://royalsocietypublishing.org/doi/10.1098/rsos.231619>

GERMAIN LEFEBVRE, OPHÉLIA DERROY & BAHADOR BAHRAMI – The roots of polarization in the individual reward system

Polarization raises concerns for democracy and society, which have expanded in the internet era where (mis)information has become ubiquitous, its transmission faster than ever, and the freedom and means of opinion expressions are expanding. The origin of polarization however remains unclear, with multiple social and emotional factors and individual reasoning biases likely to explain its current forms. In the present work, we adopt a principled approach and show that polarization tendencies can take root in biased reward processing of new information in favour of choice confirmatory evidence. Through agent-based simulations, we show that confirmation bias in individual learning is an independent mechanism and could be sufficient for creating polarization at group level independently of any additional assumptions about the opinions themselves, a priori beliefs about them, information transmission mechanisms or the structure of social relationship between individuals. This generative process can interact with polarization mechanisms described elsewhere, but constitutes an entrenched biological tendency that helps explain the extraordinary resilience of polarization against mitigating efforts such as dramatic informational change in the environment.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.2011>

Science

REVIEWS

APRIL NOWELL – Knowing the Neanderthal

An archaeologist seeks to strip away modern misconceptions about our extinct relatives. Review of 'The Naked Neanderthal: A new understanding of the human creature' by Ludovic Slimak, Pegasus (2024).

<https://www.science.org/doi/10.1126/science.adn6093>

Trends in Cognitive Sciences

PAPERS

FRANCESCO POLI et al – Curiosity and the dynamics of optimal exploration

What drives our curiosity remains an elusive and hotly debated issue, with multiple hypotheses proposed but a cohesive account yet to be established. This review discusses traditional and emergent theories that frame curiosity as a desire to know and a drive to learn, respectively. We adopt a model-based approach that maps the temporal dynamics of various factors underlying curiosity-based exploration, such as uncertainty, information gain, and learning progress. In so doing, we identify the limitations of past theories and posit an integrated account that harnesses their strengths in describing curiosity as a tool for optimal environmental exploration. In our unified account, curiosity serves as a 'common currency' for exploration, which must be balanced with other drives such as safety and hunger to achieve efficient action.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(24\)00028-7](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00028-7)

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