EAORC BULLETIN 1,001 – 21 August 2022

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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.

EAORC NEWS – Congratulations for 1,000th Issue

Congratulations on this 1000th Issue! A fantastic achievement.
Continued thanks and much respect for your ceaseless dedication to producing and sharing such a valuable resource.
Catherine Arthur

Congratulations on your 1,000th issue! Maybe you have cracked open something with bubbles...
Jim Toller
{Yes, an Aero.}

Congratulations for the 1000th issue of your bulletin.
Best wishes
Jacques Vauclair

ACADEMIA.EDU – Comparing Native American and European Traditional Beliefs and Performance

ROSLYN M. FRANK. Comparing Native American and European Traditional Beliefs and Performance: Ritual Practitioners and Bear Impersonators. Roslyn M. Frank: Iowa City, IA, USA (2009).

ROSLYN FRANK – Comparing Native American and European Traditional Beliefs and Performance: Ritual Practitioners and Bear Impersonators

This monograph seeks answers to questions relating to the way that two contrasting belief systems interacted once they came in contact with each other. One of them, the most recent, was fully anthropocentric in its orientation and the other totally opposed to that position. In what follows, we will discover is that these two worldviews often ended up fused together in truly remarkable ways. This was the result of a kind of compromise, one that resulted in hybrid entities. Two genetically unrelated and geographically distinct datasets will be analyzed. One of them comes from Native North America and draws heavily on research that has been done on the Lenape Delaware people, an Algonquian-speaking group. The second consists of European ethnographic and ethnohistoric materials with a concentration on traditional performance art.
In the cosmology most familiar to readers, human beings are conceptualized as having been created by an anthropomorphically configured deity, e.g., the Christian God, whereas other animals are assigned to a lower rung on the great Ladder of Being (Latin scala naturae) (Lovejoy,1960 [1936]). Implicit in this quite well-known and widely accepted Western paradigm is the assumption that agency should be solely assigned to the realm of the human. In addition, forms of superhuman agency and power are commonly attributed to anthropomorphically conceived figures, for instance, beings that fall into the category of deities. Even saints and priests are often believed to be able to carry out otherwise supernatural acts by means of divine intervention, including the ability to heal the sick and exorcise demons (Frank, 2022a). On this view, agency is conferred to humans but not to animals, such as bears. As Thompson has noted, "[s]uch an assumption is in line with Abrahamic mythological discourses that emphasize the absolute categorical difference between humans and all other forms of life ('God made man in His image')" (Thompson, 2018: 74).
In the second, far less familiar cosmology which will be examined in this study, human animals are viewed as descending from bears. And that means that the so-called animal nature of human beings is not questioned. Rather it is a given. Similarly, agency is no longer assigned exclusively to humans. Obviously, the ursine cosmology represents a challenge to the commonly accepted Western human-animal binary. However, it coincides with the rethinking that has been going on with regard to our most basic ontological category: what it means to be human (Thompson, 2018, 2019).
https://www.academia.edu/84707536/Comparing_Native_American_and_European_Traditional_Beliefs_and_Performance_Ritual_Practitioners_and_Bear_Impersonators

ACADEMIA.EDU – Life history of a large flake biface

Quaternary Science Reviews 190, 123-136 (2018).

JAVIER BAENA PREYSLER, CONCEPCIÓN TORRES NAVAS & GONEN SHARON – Life history of a large flake biface

Bifaces, primarily handaxes and cleavers, are the hallmark of the Acheulian techno-complex lithic industry. They spread across Africa and Eurasia during the Early to Middle Pleistocene. While many at-tempts have been made to define and describe the typology and technology of these tools, most focus on a single stage in their manufacture and usage, from quarry to discard. These attempts are fragmented, primarily due to the fact that at no single site are all stages of biface manufacture and use represented. An additional factor that appears to impede attempts to present the full "life cycle" of bifaces is the view of all Acheulian assemblages as belonging to a single cultural entity. While all assemblages belong to the same techno-complex, distinct stages and phases should be recognized, each different in typology, technology, and probably also in chronology. This research focuses on the large flake stage of the Acheulian. Data accumulated over many years of research from different regions are analyzed together in an attempt to present a holistic view of the life cycle of a biface. The study of particular Acheulian sites from the Levant and Western Europe enables us to reconstruct all stages of the biface, from raw material exploitation to final discard. The result is a model more comprehensive and precise than those suggested previously for understanding the Large Flake Acheulian.
https://www.academia.edu/36682945/Life_history_of_a_large_flake_biface

ACADEMIA.EDU – Major Transitions in Evolution

Talk given at University of Liverpool - Evolutionary Anthropology Seminar - 28 January 2021.

KIT (CHRISTOPHER) OPIE – Major Transitions in Evolution - how to understand the present

How do we understand the changes currently taking place in society? Two evolutionary biologists, John Maynard Smith and Eors Szathmary, identified eight major evolutionary transitions in the way information is stored and transmitted from one generation to the next since life on Earth began, 4 billion years ago. From the common features of these transitions, the last of which was the evolution of human society and language, they argue that two human inventions rank as major transitions too. Writing, invented five thousand years ago, brought about large-scale human societies they argue, and computer technology is driving the current transition and the changes that it is bringing are every bit as transformative as the previous ones. Within this evolutionary framework - can research in the social sciences and humanities help us understand the impact these major transitions are having on society?
https://www.academia.edu/video/l8g281

CONFERENCE ALERT – The Place of Pragmatics in the Evolution of Language

I'm writing to share some information on a workshop on The Place of Pragmatics in the Evolution of Language which is part of the Joint Conference on Language Evolution in Japan on 4-5 September 2022.
The workshop web page is here:
https://northumbriaenglish.org/pragmatics-and-language-evolution/
It contains a link to the programme (word document):
https://northumbriaenglish.files.wordpress.com/2022/08/pragmaticsworkshopprogramme-jcole-2022.docx
and a registration page:
https://www.eventbrite.co.uk/e/the-place-of-pragmatics-in-the-evolution-of-language-online-and-hybrid-tickets-399489763637
The workshop will be online on the 4th of September and hybrid on the 5th.
Please register at the above link to receive information on how to join online on the 4th.
To attend on the 5th, you will also need to register at the main conference website:
https://sites.google.com/view/joint-conf-language-evolution/registration
Please ask if you have any questions about the workshop.
Thanks and best wishes,
Billy Clark and Andrew Feeney

NEWS

NATURE BRIEFING – Major megalithic site discovered in Spain

A huge complex of more than 500 standing stones has been discovered in southern Spain during an archaeological survey of a plot of land earmarked for an avocado plantation. "This is the biggest and most diverse collection of standing stones grouped together in the Iberian peninsula," says archaeologist José Antonio Linares. The oldest of the megaliths — which include stone circles, mounds and tombs — were probably placed during the sixth or fifth millennium BC.
https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=c405436f52&e=1db4b9a19b

SCIENCE NEWS – Chewing burns more calories than you think—and may have shaped our evolution

Study is first to put a hard number on how much energy we use grinding our gums.
https://www.science.org/content/article/chewing-burns-more-calories-you-think-and-may-have-shaped-our-evolution

SCIENCE NEWS – Genes reveal how our pelvis evolved for upright walking

Embryonic tissue samples also indicate when during pregnancy the pelvis takes shape.
https://www.science.org/content/article/genes-reveal-how-our-pelvis-evolved-upright-walking

SOCIETY FOR SCIENCE – Why humans have more voice control than any other primates

Unlike all other studied primates, humans lack vocal membranes. That lets humans produce the sounds that language is built on, a new study suggests.
https://www.sciencenews.org/article/humans-primates-voice-control-cords-larynx-membrane

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

JOSEPH T. FELDBLUM et al – Predictors and consequences of gestation length in wild chimpanzees

Energetics are widely recognized to influence timing of birth in humans and other eutherian mammals, yet considerable variation exists in the relationship between energetic constraints and gestation length. In humans, poor nutrition and short inter-gestational intervals (IGIs) are associated with shorter gestations. In other mammals, lower energy availability is usually associated with longer gestations. We investigated the predictors of gestation length, and the impact of gestation length on offspring survival, in chimpanzees, humans' closest living relatives.
We used 50 years of demographic and behavioral data to estimate gestation lengths in the wild chimpanzees of Gombe National Park, Tanzania, and then used ecological and demographic data to explore the predictors and consequences of gestation length in our sample.
Gestation lengths were shorter for females in their early 30s (relative to younger and older females), and after short IGIs. Other predictors potentially associated with maternal energetic condition and maternal investment were not associated with gestation length. We also found that shorter gestation lengths corresponded to lower offspring survival.
Like humans, chimpanzees had shorter gestations after short IGIs, and short gestations were associated with higher offspring mortality. We consider competing explanations for the conflicting relationships between energetics and gestation length across eutherian mammals in light of these results.
https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24601

Current Biology

PAPERS

PRACHI PATEL et al – Interaction of bottom-up and top-down neural mechanisms in spatial multi-talker speech perception

How the human auditory cortex represents spatially separated simultaneous talkers and how talkers' locations and voices modulate the neural representations of attended and unattended speech are unclear. Here, we measured the neural responses from electrodes implanted in neurosurgical patients as they performed single-talker and multi-talker speech perception tasks. We found that spatial separation between talkers caused a preferential encoding of the contralateral speech in Heschl's gyrus (HG), planum temporale (PT), and superior temporal gyrus (STG). Location and spectrotemporal features were encoded in different aspects of the neural response. Specifically, the talker's location changed the mean response level, whereas the talker's spectrotemporal features altered the variation of response around response's baseline. These components were differentially modulated by the attended talker's voice or location, which improved the population decoding of attended speech features. Attentional modulation due to the talker's voice only appeared in the auditory areas with longer latencies, but attentional modulation due to location was present throughout. Our results show that spatial multi-talker speech perception relies upon a separable pre-attentive neural representation, which could be further tuned by top-down attention to the location and voice of the talker.
https://www.cell.com/current-biology/fulltext/S0960-9822(22)01196-4

PATRÍCIA IZAR et al with ELISABETTA M. VISALBERGHI – Stone tools improve diet quality in wild monkeys

Tool use is a fundamental feature of human evolution. Stone tools are in the archaeological record from 3.4 Ma, even before Homo, and the use of stone tools probably predated the split between hominins and panins. Using tools (hereafter, tooling cf Fragaszy and Mangalam) is hypothesized to have improved hominins' foraging efficiency or access to high-quality foods. This hypothesis is supported if feeding with tools positively contributes to diet quality in extant non-human primates or if foraging efficiency is increased by tooling. However, the contribution of tooling to non-human primates' foraging success has never been investigated through a direct analysis of nutritional ecology. We used multi-dimensional nutritional geometry to analyze energy and macronutrients (nonstructural carbohydrates, lipids, and protein) in the diets of wild capuchin monkeys (Sapajus libidinous) that routinely crack palm nuts with stone hammers. We show that eating nuts obtained through tooling helps monkeys to achieve more consistent dietary intakes. Tooling increased the net energy gain by 50% and decreased the proportion of fiber ingested by 7%. Tooling also increased the daily non-protein energy intake. By contrast, protein intake remained constant across foraging days, suggesting a pattern of macronutrient regulation called protein prioritization, which is also found in contemporary humans. In addition, tooling reduced dispersion in the ratio of protein to non-protein energy, suggesting a role in macronutrient balancing. Our findings suggest that tooling prior to tool making could have substantially increased the nutritional security of ancestral hominins, sowing the seeds for cultural development.
https://www.cell.com/current-biology/fulltext/S0960-9822(22)01205-2

eLife

PAPERS

BIN WAN et al – Heritability and cross-species comparisons of human cortical functional organization asymmetry

The human cerebral cortex is symmetrically organized along large-scale axes but also presents inter-hemispheric differences in structure and function. The quantified contralateral homologous difference, that is asymmetry, is a key feature of the human brain left-right axis supporting functional processes, such as language. Here, we assessed whether the asymmetry of cortical functional organization is heritable and phylogenetically conserved between humans and macaques. Our findings indicate asymmetric organization along an axis describing a functional trajectory from perceptual/action to abstract cognition. Whereas language network showed leftward asymmetric organization, frontoparietal network showed rightward asymmetric organization in humans. These asymmetries were heritable in humans and showed a similar spatial distribution with macaques, in the case of intra-hemispheric asymmetry of functional hierarchy. This suggests (phylo)genetic conservation. However, both language and frontoparietal networks showed a qualitatively larger asymmetry in humans relative to macaques. Overall, our findings suggest a genetic basis for asymmetry in intrinsic functional organization, linked to higher order cognitive functions uniquely developed in humans.
https://elifesciences.org/articles/77215

Frontiers in Psychology

PAPERS

ASHRAF ATTA M. S. SALEM et al – Altruistic behaviors and cooperation among gifted adolescents

The present study is a differential study that describes the nature of the relationship between cooperation and altruistic behavior in a sample of gifted adolescents in three universities in Egypt and Kuwait University. It also identified the differences between males/females, and senior students/junior students in both cooperation and altruism. A total of 237 gifted adolescents—with average age 21.3 ± SD 2.6 years—from three Egyptian universities: Alexandria University, Sadat Academy for Management Sciences, and Suez University (in Egypt), and Kuwait University, were involved in this study.

Measures used in the study include the Scales for Rating the Behavioral Characteristics of Superior Students (SRBCSS), Generative Altruism Scale (GAlS), and The Cooperative/Competitive Strategy Scale (CCSS). Results revealed that there is a significant positive relationship between altruism and cooperation among gifted adolescents. Also, findings show that there are statistically significant differences between males and females in both altruism and cooperation. In addition, there are differences statistically significant between senior students and junior students in both altruism and cooperation in favor of senior students. It is recommended that altruism and cooperation intervention-based programs should be designed to increase the adaptive behaviors of adolescents.
https://www.frontiersin.org/articles/10.3389/fpsyg.2022.945766/full

Language Sciences

PAPERS

INES ADORNETTI et al – How do we comprehend linguistic and visual narratives? A study in children with typical development

The present study investigated the comprehension of narrative with reference to global coherence, i.e., the global representation of story meaning and connectedness, across two different expressive modalities: stories conveyed through written language and stories conveyed through sequences of images. Two cognitive abilities possibly underpinning such comprehension were assessed: Central Coherence (CC) and Theory of Mind (ToM). Two groups of children with typical development aged between 8.00 and 10.11 years were included in the study: 40 participants received the narrative comprehension task in the linguistic modality; 40 participants were administered the narrative comprehension task in the visual condition. Analyses revealed that a change in the expressive code used to convey narratives did not entail a change in the overall comprehension performance: children of the two groups performed similarly on the narrative task. As for the cognitive abilities, CC and ToM scores were positively correlated with narrative comprehension score only in the visual narrative comprehension task, and not in the linguistic one. Moreover, a regression analysis showed that, along with age, CC significantly predicted the visual narrative comprehension score. The implications of these results are discussed.
https://www.sciencedirect.com/science/article/pii/S0388000122000407

EVGENY A. PUSHKAREV JULIA S. RASTVOROVA – States of idiosyncratic idealized cognitive models in acts of pragmatic meaning

The meta-analysis proposed in this study combines data from neuroscience, network science, pragmatics and cognitive linguistics in an attempt to determine the structures that are involved in acts of pragmatic meaning in the human connectome. Acts of pragmatic meaning involve mappings entailing value-based conceptualizations viewed as forms of specific neuronal activity constituting idealized cognitive models (ICMs). The article describes idiosyncratic ICMs as distributed subnetworks of the human cognitome, their anatomical counterparts at the connectome level, and the possible architectures of such models, particularly, those associated with acts of pragmatic meaning. The idea that ICMs have the characteristics typical of an undirected graph with its nodes constituting cogs is also developed. The metonymic nature of the ICM is stressed upon when the cogs within an ICM are implicatively connected with each other. The authors find a correlation between neural network architectures and acts of pragmatic meaning within ICMs. Besides, the role of cogs as elements of experience (including pragmatic experience) associated with activations of specific nodes in the connectome is discussed. A key hypothesis for the study is that the same neuronal pathways may participate both in the acts of pragmatic meaning and in the body's reactions to fear and danger, which enables a new classification for pragmatic meanings based on the presence or absence of excitation in the limbic system (primarily, the amygdala). This approach in its turn allows to distinguish between the dynamic and static phases of the ICM. Possible ways for further empiric development of the ICM theory are also suggested.
https://www.sciencedirect.com/science/article/abs/pii/S0388000122000389

Nature Communications

PAPERS

MATHILDA FROESEL et al – Socially meaningful visual context either enhances or inhibits vocalisation processing in the macaque brain

Social interactions rely on the interpretation of semantic and emotional information, often from multiple sensory modalities. Nonhuman primates send and receive auditory and visual communicative signals. However, the neural mechanisms underlying the association of visual and auditory information based on their common social meaning are unknown. Using heart rate estimates and functional neuroimaging, we show that in the lateral and superior temporal sulcus of the macaque monkey, neural responses are enhanced in response to species-specific vocalisations paired with a matching visual context, or when vocalisations follow, in time, visual information, but inhibited when vocalisation are incongruent with the visual context. For example, responses to affiliative vocalisations are enhanced when paired with affiliative contexts but inhibited when paired with aggressive or escape contexts. Overall, we propose that the identified neural network represents social meaning irrespective of sensory modality.
https://www.nature.com/articles/s41467-022-32512-9

MASAHIRO SAWADA et al – Mapping effective connectivity of human amygdala subdivisions with intracranial stimulation

The primate amygdala is a complex consisting of over a dozen nuclei that have been implicated in a host of cognitive functions, individual differences, and psychiatric illnesses. These functions are implemented through distinct connectivity profiles, which have been documented in animals but remain largely unknown in humans. Here we present results from 25 neurosurgical patients who had concurrent electrical stimulation of the amygdala with intracranial electroencephalography (electrical stimulation tract-tracing; es-TT), or fMRI (electrical stimulation fMRI; es-fMRI), methods providing strong inferences about effective connectivity of amygdala subdivisions with the rest of the brain. We quantified functional connectivity with medial and lateral amygdala, the temporal order of these connections on the timescale of milliseconds, and also detail second-order effective connectivity among the key nodes. These findings provide a uniquely detailed characterization of human amygdala functional connectivity that will inform functional neuroimaging studies in healthy and clinical populations.
https://www.nature.com/articles/s41467-022-32644-y

Nature Human Behaviour

NEWS

Human neonates learn to recognize speech sounds on the first day of life

Human neonates discriminate vowel sounds played forward, as in normal speech, from their waveform reversal after five hours of exposure on the first day of their life. The neural dynamics supporting this rapid perceptual learning indicate a primitive brain mechanism similar to the language-processing network of adults.
https://www.nature.com/articles/s41562-022-01368-w

PAPERS

YANMING ZHU et al – Distinct spatiotemporal patterns of syntactic and semantic processing in human inferior frontal gyrus

Human languages are based on syntax, a set of rules which allow an infinite number of meaningful sentences to be constructed from a finite set of words. A theory associated with Chomsky and others holds that syntax is a mind-internal, universal structure independent of semantics. This theory, however, has been challenged by studies of the Chinese language showing that syntax is processed under the semantic umbrella, and is secondary and not independent. Here, using intracranial high-density electrocorticography, we find distinct spatiotemporal patterns of neural activity in the left inferior frontal gyrus that are specifically associated with syntactic and semantic processing of Chinese sentences. These results suggest that syntactic processing may occur before semantic processing. Our findings are consistent with the view that the human brain implements syntactic structures in a manner that is independent of semantics.
https://www.nature.com/articles/s41562-022-01334-6

PEDRO CASTRO-RODRIGUES et al – Explicit knowledge of task structure is a primary determinant of human model-based action

Explicit information obtained through instruction profoundly shapes human choice behaviour. However, this has been studied in computationally simple tasks, and it is unknown how model-based and model-free systems, respectively generating goal-directed and habitual actions, are affected by the absence or presence of instructions. We assessed behaviour in a variant of a computationally more complex decision-making task, before and after providing information about task structure, both in healthy volunteers and in individuals suffering from obsessive-compulsive or other disorders. Initial behaviour was model-free, with rewards directly reinforcing preceding actions. Model-based control, employing predictions of states resulting from each action, emerged with experience in a minority of participants, and less in those with obsessive-compulsive disorder. Providing task structure information strongly increased model-based control, similarly across all groups. Thus, in humans, explicit task structural knowledge is a primary determinant of model-based reinforcement learning and is most readily acquired from instruction rather than experience.
https://www.nature.com/articles/s41562-022-01346-2

YAN JING WU et al – Rapid learning of a phonemic discrimination in the first hours of life

Human neonates can discriminate phonemes, but the neural mechanism underlying this ability is poorly understood. Here we show that the neonatal brain can learn to discriminate natural vowels from backward vowels, a contrast unlikely to have been learnt in the womb. Using functional near-infrared spectroscopy, we examined the neuroplastic changes caused by 5 h of postnatal exposure to random sequences of natural and reversed (backward) vowels (T1), and again 2 h later (T2). Neonates in the experimental group were trained with the same stimuli as those used at T1 and T2. Compared with controls, infants in the experimental group showed shorter haemodynamic response latencies for forward vs backward vowels at T1, maximally over the inferior frontal region. At T2, neural activity differentially increased, maximally over superior temporal regions and the left inferior parietal region. Neonates thus exhibit ultra-fast tuning to natural phonemes in the first hours after birth.
https://www.nature.com/articles/s41562-022-01355-1

Nature Scientific Reports

PAPERS

SARAH DAVIS et al with ANDREW WHITEN – Cognitive flexibility supports the development of cumulative cultural learning in children

The scale of cumulative cultural evolution (CCE) is a defining characteristic of humans. Despite marked scientific interest in CCE, the cognitive underpinnings supporting its development remain understudied. We examined the role cognitive flexibility plays in CCE by studying U.S. children's (N = 167, 3–5-year-olds) propensity to relinquish an inefficient solution to a problem in favor of a more efficient alternative, and whether they would resist reverting to earlier versions. In contrast to previous work with chimpanzees, most children who first learned to solve a puzzlebox in an inefficient way switched to an observed, more efficient alternative. However, over multiple task interactions, 85% of children who switched reverted to the inefficient method. Moreover, almost all children in a control condition (who first learned the efficient method) switched to the inefficient method. Thus, children were keen to explore an alternative solution but, like chimpanzees, are overall conservative in reverting to their first-learned one.
https://www.nature.com/articles/s41598-022-18231-7

JOSÉ BRAGA, et al – New fossils from Kromdraai and Drimolen, South Africa, and their distinctiveness among Paranthropus robustus

Most fossil hominin species are sampled with spatial, temporal or anatomical biases that can hinder assessments of their paleodiversity, and may not yield genuine evolutionary signals. We use new fossils from the Kromdraai (Unit P) and Drimolen sites (South Africa) to provide insights into the paleodiversity of the Lower Pleistocene robust australopith, Paranthropus robustus. Our focus is the morphology of the temporal bone and the relationships between size and shape (allometry) of the semi-circular canals (SCC), an aspect that has not yet been investigated among southern African australopiths. We find significant size and shape SCC differences between P. robustus from Kromdraai, Drimolen and Swartkrans. This site-related variation is consistent with other differences observed on the temporal bone. P. robustus from Kromdraai Unit P is distinctive because of its smaller temporal bone and SCC, and its proportionally less developed posterior SCC, independently of age and sex. We emphasize the importance of allometry to interpret paleodiversity in P. robustus as either the consequence of differences in body size, or as yet unknown factors. Some features of the inner ear of P. robustus represent directional selection soon after its origin, whereas the size and shape variations described here may result from evolutionary changes.
https://www.nature.com/articles/s41598-022-18223-7

WEI CHU et al – Aurignacian dynamics in Southeastern Europe based on spatial analysis, sediment geochemistry, raw materials, lithic analysis, and use-wear from Românești-Dumbrăvița

The Aurignacian is one of the first cultural-technological traditions commonly associated with the expansion of Homo sapiens in Europe. Early Homo sapiens demographics across the continent are therefore typically inferred using the distribution of Aurignacian assemblages. Western Romania has been used as a tie-point to connect the well-researched lithic assemblages from the eastern Mediterranean and Western Europe through its early Homo sapiens fossils. However, Romania's archeological record remains underexplored thereby hindering our ability to directly connect better understood regions through time and space. Here we report on excavations from the open-air Middle/Upper Paleolithic site of Românești-Dumbrăvița I in southwestern Romania. Three stratified Paleolithic assemblages were extensively excavated within a 1-m-thick eolian-deposited sequence. Spatial, geochemical, raw material, techno-typological, and use-wear analysis of the site reveal patterns of artifact configuration, resource exploitation, fire history, knapping objectives, and functionality. Taken together, Românești-Dumbrăvița I is the first well-contextualized archeological site in close spatiotemporal proximity to many early, well-preserved human fossils and in East-Central Europe.
https://www.nature.com/articles/s41598-022-15544-5

New Scientist

NEWS

People with half a brain removed do well at face and word recognition

Adults who had the left or right hemisphere of their brain removed as children to treat epileptic seizures had accuracy scores of over 80 per cent on word and face recognition tasks.
https://www.newscientist.com/article/2333604-people-with-half-a-brain-removed-do-well-at-face-and-word-recognition/

Losing parts of our voice box may have helped humans evolve to speak

Unlike people, 43 species of monkeys and apes are known to have so-called vocal membranes, which may prevent them from having precise voice control.
https://www.newscientist.com/article/2333278-losing-parts-of-our-voice-box-may-have-helped-humans-evolve-to-speak/

PeerJ

PAPERS

ANJARA SALOMA et al – Social calls in humpback whale mother-calf groups off Sainte Marie breeding ground (Madagascar, Indian Ocean)

Humpback whales (Megaptera novaeangliae) use vocalizations during diverse social interactions or activities such as foraging or mating. Unlike songs produced only by males, social calls are produced by all types of individuals (adult males and females, juveniles and calves). Several studies have described social calls in the humpback whale's breeding and the feeding grounds and from different geographic areas. We aimed to investigate for the first time the vocal repertoire of humpback whale mother-calf groups during the breeding season off Sainte Marie island, Madagascar, South Western Indian Ocean using data collected in 2013, 2014, 2016, and 2017. We recorded social calls using Acousonde tags deployed on the mother or the calf in mother-calf groups. A total of 21 deployments were analyzed. We visually and aurally identified 30 social call types and classified them into five categories: low, medium, high-frequency sounds, amplitude-modulated sounds, and pulsed sounds. The aural-visual classifications have been validated using random forest (RF) analyses. Low-frequency sounds constituted 46% of all social calls, mid-frequency 35%, and high frequency 10%. Amplitude-modulated sounds constituted 8% of all vocalizations, and pulsed sounds constituted 1%. While some social call types seemed specific to our study area, others presented similarities with social calls described in other geographic areas, on breeding and foraging grounds, and during migrating routes. Among the call types described in this study, nine call types were also found in humpback whale songs recorded in the same region. The 30 call types highlight the diversity of the social calls recorded in mother-calf groups and thus the importance of acoustic interactions in the relationships between the mother and her calf and between the mother-calf pair and escorts.

https://peerj.com/articles/13785/

PLoS Biology

PAPERS

PAOLO DI LUZIO et al – Human perceptual and metacognitive decision-making rely on distinct brain networks

Perceptual decisions depend on the ability to exploit available sensory information in order to select the most adaptive option from a set of alternatives. Such decisions depend on the perceptual sensitivity of the organism, which is generally accompanied by a corresponding level of certainty about the choice made. Here, by use of corticocortical paired associative transcranial magnetic stimulation protocol (ccPAS) aimed at inducing plastic changes, we shaped perceptual sensitivity and metacognitive ability in a motion discrimination task depending on the targeted network, demonstrating their functional dissociation. Neurostimulation aimed at boosting V5/MT+-to-V1/V2 back-projections enhanced motion sensitivity without impacting metacognition, whereas boosting IPS/LIP-to-V1/V2 back-projections increased metacognitive efficiency without impacting motion sensitivity. This double-dissociation provides causal evidence of distinct networks for perceptual sensitivity and metacognitive ability in humans.

https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001750

PLoS One

PAPERS

MENGRU WANG et al – Study on the evolution of Chinese characters based on few-shot learning: From oracle bone inscriptions to regular script

Oracle bone inscriptions (OBIs) are ancient Chinese scripts originated in the Shang Dynasty of China, and now less than half of the existing OBIs are well deciphered. To date, interpreting OBIs mainly relies on professional historians using the rules of OBIs evolution, and the remaining part of the oracle's deciphering work is stuck in a bottleneck period. Here, we systematically analyze the evolution process of oracle characters by using the Siamese network in Few-shot learning (FSL). We first establish a dataset containing Chinese characters which have finished a relatively complete evolution, including images in five periods: oracle bone inscriptions, bronze inscriptions, seal inscriptions, official script, and regular script. Then, we compare the performance of three typical algorithms, VGG16, ResNet, and AlexNet respectively, as the backbone feature extraction network of the Siamese network. The results show that the highest F1 value of 83.3% and the highest recognition accuracy of 82.67% are obtained by the combination of VGG16 and Siamese network. Based on the analysis, the typical structural performance of each period is evaluated and we identified that the optimized Siamese network is feasible to study the evolution of the OBIs. Our findings provide a new approach for oracle's deciphering further.

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0272974

DELPHINE VETTESE et al with MARIE-HÉLÈNE MONCEL – New evidence of Neandertal butchery traditions through the marrow extraction in southwestern Europe (MIS 5–3)

Long bone breakage for bone marrow recovery is a commonly observed practice in Middle Palaeolithic contexts, regardless of the climatic conditions. While lithic technology is largely used to define cultural patterns in human groups, despite dedicating research by zooarchaeologists, for now butchering techniques rarely allowed the identification of clear traditions, notably for ancient Palaeolithic periods. In this paper, we test the hypothesis of butchery traditions among Neandertal groupsusing the bone assemblages from three sites in southwestern Europe. These sites are located in southeastern France

and northern Italy and are dated to the Late Middle Palaeolithic: Abri du Maras (Marine Isotopic Stages (MIS) 4–3, Ardèche), Saint-Marcel (MIS 3, Ardèche), and Riparo Tagliente (MIS 4–3, Verona). The detection of culturally-induced patterns of bone breakage involves differentiating them from intuitively generated patterns. To tackle this issue, we used a zooarchaeological approach focusing on the percussion marks produced during the bone breakage process. Statistical analyses as the chi-square test of independence were employed to verify if percussion mark locations were randomly distributed, and if these distributions were different from the intuitive ones. For femurs and humeri, our results demonstrate that Neandertal groups occupying the Abri du Maras (levels 4.1 and 4.2) and the Saint-Marcel Cave (levels g and h) sites in France applied butchery traditions to recover yellow marrow. However, the traditions developed at each site were different. On the contrary, in Riparo Tagliente, in Italy, several groups or individuals of a same group did not share the same butchery traditions over time. Regarding the Abri du Maras and Saint Marcel Cave assemblages, our research demonstrates that Neandertal groups applied intense standardized bone breakage, far from the intuitive practice observed experimentally and related to bone density and/or skeletal morphology. These standardized patterns, which are systematic and counter-intuitive, can be interpreted as culturally induced for the Abri du Maras and Saint Marcel Cave. The diversity of Neandertal traditions should be considered by taking into account the butchery, in particular the practice of bone marrow extraction, and not only technological behaviours and types of tool kits.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0271816

HOI-LAM JIM et al – Wolves and dogs fail to form reputations of humans after indirect and direct experience in a food-giving situation

Reputation is a key component in social interactions of group-living animals and appears to play a role in the establishment of cooperation. Animals can form reputations of individuals by directly interacting with them or by observing them interact with a third party, i.e., eavesdropping. Previous research has focused on whether dogs (Canis lupus familiaris) can eavesdrop on humans because of their ability to cooperate with humans, however the results are mixed and if they can eavesdrop, it is unknown whether this ability evolved during the domestication process or whether it was inherited from their ancestor, wolves (Canis lupus). Our study investigated whether equally hand-raised, pack-living dogs and wolves can form reputations of humans in a food-giving situation through indirect and/or direct experience. The experimental procedure comprised three parts: baseline (to test whether the subject preferred a person prior to the experiment), observation and testing. In the observation phase, the subject observed two humans interact with a dog demonstrator–one acted generously and fed the dog, and the other acted selfishly and refused to feed the dog. The subject could then choose which person to approach in the test phase. In the following experience phase, the animals interacted directly with the same two humans who behaved either in a generous or selfish manner. Then, they were again given a choice whom to approach. We found that dogs and wolves, at the group level, did not differentiate between a generous or selfish partner after indirect or direct experience, but wolves were more attentive towards the generous person during the observation phase and some dogs and wolves did prefer the generous partner, at least after indirect and direct experience was combined. Our study suggests that reputation formation may be more difficult than expected for animals and we emphasise the importance of context when studying reputation formation in animals.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0271590

EVA FRANCESCA et al – Beyond the main function: An experimental study of the use of hardwood boomerangs in retouching activities

Retouched lithic tools result from the functional modification of their edges following knapping operations. The study of the later stages of the reduction sequence is fundamental to understanding the techno-functional features of any toolkit. In Australia, a gap exists in the study of the chaîne opératoire of lithic tools shaped or re-shaped through percussion retouching. In our previous works (Martellotta EF., 2021, Martellotta EF., 2022), we have presented evidence for the use of hardwood boomerangs for retouching purposes in Australian Aboriginal communities. Through a detailed experimental protocol, the present study demonstrates how boomerangs can function as retouchers. We found that the use-wear generated on the boomerang's surface during retouch activity is comparable to retouch-induced impact traces observed on Palaeolithic bone retouchers, as well as to experimental bone retouchers generated in our replication experiments. Finally, we explore the role that microscopic lithic chips embedded in the retouchers' surface play in the formation process of retouching marks. Our results address the need for a deeper investigation of percussion retouching techniques in Australian contexts, opening the possibility that uncommon objects—such as boomerangs—could be used for this task. This concept also highlights the broader topic of the highly diverse multipurpose application of many Indigenous tools throughout Australia. At the same time, the study reveals a deep functional connection between osseous and wooden objects—a topic rarely investigated in archaeological contexts.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0273118

BENJAMIN SCHÜRCH et al – The origin of chert in the Aurignacian of Vogelherd Cave investigated by infrared spectroscopy

The analyses of raw material provenance offers the possibility of tracing short and long-distance raw material transport. So far, most studies of raw material of flint and chert in Europe have been based on macroscopic analyses. We apply infrared spectroscopy to Aurignacian assemblages from Vogelherd cave and to the Magdalenian site Randecker Maar in southwestern

Germany. We compare raw material samples from three chert-bearing areas in Germany with archaeological samples from Vogelherd. Our results show that infrared spectroscopy can distinguish between different raw materials. Our archaeological samples from Vogelherd correspond to the sampled geological cherts in terms of their spectral signature. Our comparison of reference samples and archaeological samples highlights problems in commonly used macroscopic identifications of chert raw materials.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0272988

ANNALISA CHIELI et al – Characterizing paint technologies and recipes in Levantine and Schematic rock art: El Carche site as a case study (Jalance, Spain)
This paper contributes to current debates on the technologies and practices of prehistoric artists using the rock art site of el Carche (Jalance, Spain) as a case study. The site preserves both Levantine and Schematic paintings, yet poorly understood from an analytical point of view. In the past, it has even been argued how little differentiation there is between these two post-Paleolithic traditions in terms of paint composition. Our aim with this paper was to identify pigments, paint recipes and technologies and decipher the order of the superimpositions, both between Levantine motifs of different styles, and between these and the Schematic ones. To do so, we adopted a multi-stage and multi-technical analytical strategy, trying to find a balance between sound scientific investigation and impact on the art, considering the irreplaceable nature of this World Heritage rock art. As such, our approach begins with in situ non-invasive investigations using portable EDXRF, to then collect micro-samples for non-destructive analyses by means of Optical Microscopy, Scanning Electron Microscopy coupled with Energy Dispersive X-Ray Spectroscopy (SEM-EDX), micro-Raman Spectroscopy and Fourier Transform Infrared Spectroscopy (FTIR). One of the key highlights of these paper is the identification of up to four different paint compositions, produced with various hematite-based raw materials and different processing techniques. This variability had not been previously documented. Interestingly though, no direct correlations appear to exist between styles or sub-styles and recipes. Some of these paint mixtures were even shared by both traditions. These results are discussed in cultural terms, challenging previous interpretations suggesting a similar pigment composition between Levantine and Schematic art. Microstratigraphic analysis of the cross-sections only partially clarified the overlapping sequence unveiling the complexity of these analysis. They also revealed several degradation layers and external crusts related to rock alteration processes and biological formations. Their role in rock art conservation is also discussed.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0271276

Quarterly Review of Biology

PAPERS

MARIA G. SMITH & CHRISTINA RIEHL – Workload Distribution and Division of Labor in Cooperative Societies
Cooperative groups are ubiquitous in animals, as are the challenges of allocating labor to accomplish cooperative tasks, including territory defense, hunting, and brood care. Individual contributions can differ in two ways, both of which can influence fitness: group members can vary in overall helpfulness (workload) or they can specialize on different tasks (division of labor). In this review, we encourage additional, simultaneous study of both workload distribution and division of labor. Historically, workload distribution has been studied in the contexts of collective action and cooperative offspring care. Both areas of research aim to understand how shared benefits can emerge from individual contributions, but they remain poorly integrated. We argue that each of these literatures has strengths that could benefit the other, and we highlight potential areas of crosstalk. Next, we review the literature on division of labor in taxa other than the eusocial insects, discuss parallels and differences in division of labor between eusocial insects and other animals, and encourage more work on cooperative, noninsect taxa. Rigorous work on individual contributions to cooperative tasks will expand our understanding of the causes and consequences of individual variation and the evolutionary stability of social living.
https://www.journals.uchicago.edu/doi/abs/10.1086/721520

Science

NEWS

Genes reveal how our pelvis evolved for upright walking
Embryonic tissue samples also indicate when during pregnancy the pelvis takes shape.
https://www.science.org/content/article/genes-reveal-how-our-pelvis-evolved-upright-walking

Science Advances

PAPERS

ADAM VAN CASTEREN et al – The cost of chewing: The energetics and evolutionary significance of mastication in humans
Any change in the energetic cost of mammalian mastication will affect the net energy gain from foods. Although the energetic efficiency of masticatory effort is fundamental in understanding the evolution of the human masticatory system, nothing is known currently about the associated metabolic costs of chewing different items. Here, using respirometry and electromyography of the masseter muscle, we demonstrate that chewing by human subjects represents a measurable energy sink. Chewing a tasteless odorless gum elevates metabolic rate by 10 to 15% above basal levels. Energy expenditure increases

with gum stiffness and is paid for by greater muscle recruitment. For modern humans, it is likely that mastication represents a small part of the daily energy budget. However, for our ancestors, before the onset of cooking and sophisticated food processing methods, the costs must have been relatively high, adding a previously unexplored energetic dimension to the interpretation of hominin dentofacial fossils.
https://www.science.org/doi/full/10.1126/sciadv.abn8351

MARIEL YOUNG et al – The developmental impacts of natural selection on human pelvic morphology
Evolutionary responses to selection for bipedalism and childbirth have shaped the human pelvis, a structure that differs substantially from that in apes. Morphology related to these factors is present by birth, yet the developmental-genetic mechanisms governing pelvic shape remain largely unknown. Here, we pinpoint and characterize a key gestational window when human-specific pelvic morphology becomes recognizable, as the ilium and the entire pelvis acquire traits essential for human walking and birth. We next use functional genomics to molecularly characterize chondrocytes from different pelvic subelements during this window to reveal their developmental-genetic architectures. We then find notable evidence of ancient selection and genetic constraint on regulatory sequences involved in ilium expansion and growth, findings complemented by our phenotypic analyses showing that variation in iliac traits is reduced in humans compared to African apes. Our datasets provide important resources for musculoskeletal biology and begin to elucidate developmental mechanisms that shape human-specific morphology.
https://www.science.org/doi/full/10.1126/sciadv.abq4884

Trends in Neurosciences

ARTICLES

DAVID L. BARACK et al – A call for more clarity around causality in neuroscience
In neuroscience, the term ‘causality’ is used to refer to different concepts, leading to confusion. Here we illustrate some of those variations, and we suggest names for them. We then introduce four ways to enhance clarity around causality in neuroscience.
https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(22)00121-7

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