EAORC BULLETIN 1,100 – 14 July 2024

CONTENTS

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 – Middle Paleolithic Symbolism: Current evidence and interpretations

Journal of Anthropological Archaeology 6, 263-296 (1987).

PHILIP G. CHASE & HAROLD L. DIBBLE – Middle Paleolithic Symbolism: A review of current evidence and interpretations

Identifying the origins of symbolism and of linguistically structured behavior is crucial to our understanding of the evolution of modern humanity. A critical survey of the archaeological data indicates that many aspects of modern adaptation—foresight and planning, affection and mutual assistance, and even a sense of esthetics—are clearly apparent by the Middle Paleolithic. However, currently available evidence fails to indicate the presence of symbolic thought or symbolic behavior before the Middle/Upper Paleolithic transition.

{A good example of why symbolism never really got anywhere in explaining human origins: symbolic thought caused symbolic behaviour which caused language; but what caused symbolic thought? We have learned a lot since this paper, not least that the lack of symbolic fossils before the 40kya "barrier" was more absence of evidence that evidence of absence. By looking beyond the primate clade we have found examples of symbolism in many other species, most of which are only distantly related to the hominin clade. Symbolic thought is either much older in our species history than this paper assumed, or it has separately evolved in many different species, making it a common evolutionary response to environmental complexity. Foresight gives us hypotheses; hindsight refines the hypotheses into theories (or rejects them). This paper is included in the Bulletin as a comparator for modern approaches.}

https://www.academia.edu/1585884/Middle_paleolithic_symbolism_A_review_of_current_evidence_and_interpretations

NEWS

SCIENCE DAILY – Brain size riddle solved as humans exceed evolution trend

The largest animals do not have proportionally bigger brains -- with humans bucking this trend -- a new study has revealed.
https://www.sciencedaily.com/releases/2024/07/240708101004.htm

SCIENCE DAILY – Blue and great tits deploy surprisingly powerful memories to find food

Blue and great tits recall what they have eaten in the past, where they found the food and when they found it, a new study shows. In the first experiment of its kind to involve wild animals, blue and great tits demonstrated 'episodic-like' memory to cope with changes in food availability when foraging. The same study may suggest that humans leaving out seeds and nuts for garden birds could be contributing to the evolution of these memory traits.
https://www.sciencedaily.com/releases/2024/07/240703131727.htm

SCIENCE DAILY – Early Pyrenean Neolithic groups used species selection strategies for bone artifacts

A study has revealed that the earliest Neolithic groups to settle some 7,000 years ago in the Pyrenean site of Coro Trasito (Tella, Huesca) used species selection strategies to manufacture their tools made out of bone and chose deer for the projectile tips. The study applied for the first time in a Neolithic site an innovative combination of methods to obtain these results.
https://www.sciencedaily.com/releases/2024/07/240711111501.htm

SCIENCE DAILY – Brain-imaging study reveals curiosity as it emerges

You look up into the clear blue sky and see something you can't quite identify. Is it a balloon? A plane? A UFO? You're curious, right? A research team has for the first time witnessed what is happening in the human brain when feelings of curiosity like this arise. The scientists revealed brain areas that appear to assess the degree of uncertainty in visually ambiguous situations, giving rise to subjective feelings of curiosity.
https://www.sciencedaily.com/releases/2024/07/240708222424.htm

SCIENCE DAILY – Introducing co-cultures: When co-habiting animal species share culture

Cooperative hunting, resource sharing, and using the same signals to communicate the same information -- these are all examples of cultural sharing that have been observed between distinct animal species. In a new article, researchers introduce the term 'co-culture' to describe cultural sharing between animal species. These relationships are mutual and go beyond one species watching and mimicking another species' behavior -- in co-cultures, both species influence each other in substantial ways.
https://www.sciencedaily.com/releases/2024/07/240711132154.htm

SCIENCE DAILY – Why are board games so popular among many people with autism?

Board gaming is a growing industry, and anecdotally popular among people who display autistic traits. Now new research has highlighted the science supporting the anecdote -- and the important reasons behind the link.
https://www.sciencedaily.com/releases/2024/07/240712124113.htm

SCIENCE.ORG NEWS – Accusations are levelled at research on how dancing bees measure distances

Scientists allege irregularities in high-profile papers documenting honeybee "odometer".
https://www.science.org/content/article/buzzkill-accusations-leveled-research-dancing-bees-measure-distances

SCIENCE.ORG NEWS – The most ancient human genome yet has been sequenced—and it's a Denisovan's

200,000-year-old DNA from Siberian cave shows our elusive, extinct cousins mated repeatedly with Neanderthals.
https://www.science.org/content/article/most-ancient-human-genome-yet-has-been-sequenced-and-it-s-denisovan

SCIENCE.ORG NEWS – Neanderthals and modern humans mingled early and often

Ancient DNA study gives a Neanderthal-eye view of prehistory, offers clues to how our cousins vanished.
https://www.science.org/content/article/neanderthals-and-modern-humans-mingled-early-and-often

THE CONVERSATION – Why consciousness may have evolved to benefit society rather than individuals

The experience of subjective awareness may have evolved to enable the communication of privately experienced ideas and feelings.
https://theconversation.com/why-consciousness-may-have-evolved-to-benefit-society-rather-than-individuals-232459

PUBLICATIONS

Current Biology

PAPERS

FÉLIX BIGAND et al – The geometry of interpersonal synchrony in human dance

Collective synchronized behavior has powerful social-communicative functions observed across several animal taxa. Operationally, synchronized behavior can be explained by individuals responding to shared external cues (e.g., light, sound, or food) as well as by inter-individual adaptation. We contrasted these accounts in the context of a universal human practice—collective dance—by recording full-body kinematics from dyads of laypersons freely dancing to music in a "silent disco" setting. We orthogonally manipulated musical input (whether participants were dancing to the same, synchronous music) and visual contact (whether participants could see their dancing partner). Using a data-driven method, we decomposed full-body kinematics of 70 participants into 15 principal movement patterns, reminiscent of common dance moves, explaining over 95% of kinematic variance. We find that both music and partners drive synchrony, but through distinct dance moves. This leads to distinct kinds of synchrony that occur in parallel by virtue of a geometric organization: anteroposterior movements such as head bobs synchronize through music, while hand gestures and full-body lateral movements synchronize through visual contact. One specific dance move—vertical bounce—emerged as a supramodal pacesetter of coordination, synchronizing through both music and visual contact, and at the pace of the musical beat. These findings reveal that synchrony in human dance is independently supported by shared musical input and inter-individual adaptation. The independence between these drivers of synchrony hinges on a geometric organization, enabling dancers to synchronize to music and partners simultaneously by allocating distinct synchronies to distinct spatial axes and body parts.
https://www.cell.com/current-biology/fulltext/S0960-9822(24)00698-5

HIROMASA TAKEMURA et al with CHET C. SHERWOOD – A prominent vertical occipital white matter fasciculus unique to primate brains

Vision in humans and other primates enlists parallel processing streams in the dorsal and ventral visual cortex, known to support spatial and object processing, respectively. These streams are bridged, however, by a prominent white matter tract, the vertical occipital fasciculus (VOF), identified in both classical neuroanatomy and recent diffusion-weighted magnetic resonance imaging (dMRI) studies. Understanding the evolution of the VOF may shed light on its origin, function, and role in visually guided behaviors. To this end, we acquired high-resolution dMRI data from the brains of select mammalian species, including anthropoid and strepsirrhine primates, a tree shrew, rodents, and carnivores. In each species, we attempted to delineate the VOF after first locating the optic radiations in the occipital white matter. In all primate species examined, the optic radiation was flanked laterally by a prominent and coherent white matter fasciculus recognizable as the VOF. By contrast, the equivalent analysis applied to four non-primate species from the same superorder as primates (tree shrew, ground squirrel, paca, and rat) failed to reveal white matter tracts in the equivalent location. Clear evidence for a VOF was also absent in two larger carnivore species (ferret and fox). Although we cannot rule out the existence of minor or differently organized homologous fiber pathways in the non-primate species, the results suggest that the VOF has greatly expanded, or possibly emerged, in the primate lineage. This adaptation likely facilitated the evolution of unique visually guided behaviors in primates, with direct impacts on manual object manipulation, social interactions, and arboreal locomotion.
https://www.cell.com/current-biology/abstract/S0960-9822(24)00818-2

eLife

PAPERS

YALI PAN et al – Early parafoveal semantic integration in natural reading

Humans can read and comprehend text rapidly, implying that readers might process multiple words per fixation. However, the extent to which parafoveal words are previewed and integrated into the evolving sentence context remains disputed. We investigated parafoveal processing during natural reading by recording brain activity and eye movements using MEG and an eye tracker while participants silently read one-line sentences. The sentences contained an unpredictable target word that was either congruent or incongruent with the sentence context. To measure parafoveal processing, we flickered the target words at 60 Hz and measured the resulting brain responses (i.e. Rapid Invisible Frequency Tagging, RIFT) during fixations on the pre-target words. Our results revealed a significantly weaker tagging response for target words that were incongruent with the previous context compared to congruent ones, even within 100ms of fixating the word immediately preceding the target. This reduction in the RIFT response was also found to be predictive of individual reading speed. We conclude that semantic information is not only extracted from the parafovea but can also be integrated with the previous context before the word is fixated. This early and extensive parafoveal processing supports the rapid word processing required for natural reading. Our study suggests that theoretical frameworks of natural reading should incorporate the concept of deep parafoveal processing.
https://elifesciences.org/articles/91327

TIMO VAN KERKOERLE et al with STANISLAS DEHAENE & GHISLAINE DEHAENE-LAMBERTZ – Brain areas for reversible symbolic reference, a potential singularity of the human brain

The emergence of symbolic thinking has been proposed as a dominant cognitive criterion to distinguish humans from other primates during hominization. Although the proper definition of a symbol has been the subject of much debate, one of its simplest features is bidirectional attachment: the content is accessible from the symbol, and vice versa. Behavioural observations scattered over the past four decades suggest that this criterion might not be met in non-human primates, as they fail to generalise an association learned in one temporal order (A to B) to the reverse order (B to A). Here, we designed an implicit fMRI test to investigate the neural mechanisms of arbitrary audio-visual and visual-visual pairing in monkeys and humans and probe their spontaneous reversibility. After learning a unidirectional association, humans showed surprise signals when this learned association was violated. Crucially, this effect occurred spontaneously in both learned and reversed directions, within an extended network of high-level brain areas, including, but also going beyond, the language network. In monkeys, by contrast, violations of association effects occurred solely in the learned direction and were largely confined to sensory areas. We propose that a human-specific brain network may have evolved the capacity for reversible symbolic reference.
https://elifesciences.org/reviewed-preprints/87380

XINLIN HOU et al – Neonatal sensitivity to vocal emotions: A milestone at 37 weeks of gestational age

Emotional responsiveness in neonates, particularly their ability to discern vocal emotions, plays an evolutionarily adaptive role in human communication and adaptive behaviors. The developmental trajectory of emotional sensitivity in neonates is a crucial area of inquiry for understanding the foundations of early social-emotional functioning. However, the precise onset of this sensitivity in neonates and its relationship with gestational age (GA) remain subjects of investigation. In a study involving 120 healthy neonates categorized into six groups based on their GA (ranging from 35 and 40 weeks), we delved into their emotional responses to vocal stimuli. These stimuli encompassed disyllables with happy and neutral prosodies, alongside acoustically matched nonvocal control sounds. The assessments occurred during natural sleep states in neonates, utilizing the odd-ball paradigm and event-related potentials. The results unveil a distinct developmental milestone at 37 weeks GA, marking the point at which neonates exhibit heightened perceptual acuity for emotional vocal expressions. This newfound ability is substantiated by the presence of the mismatch response, akin to an initial form of adult mismatch negativity, elicited in response to positive emotional vocal prosody. Notably, this perceptual shift's specificity becomes evident when no such discrimination is observed in acoustically matched control sounds. Neonates born before 37 weeks GA do not display this level of discrimination ability. This critical developmental milestone carries significant implications for our understanding of early social-emotional development, shedding light on the role of gestational age in shaping early perceptual abilities. Moreover, it introduces the potential for a valuable screening tool in the context of autism, which is characterized by atypical social-emotional functions. This study makes a substantial contribution to the broader field of developmental neuroscience and holds promise for early intervention in neurodevelopmental disorders.
https://elifesciences.org/reviewed-preprints/95393

PEIPEI QIN et al – Microstructural asymmetries of the planum temporale predict functional lateralization of auditory-language processing

Structural hemispheric asymmetry has long been assumed to guide functional asymmetry of the human brain, but empirical evidence for this compelling hypothesis remains scarce. Recently, it has been suggested that microstructural asymmetries may be more relevant to functional asymmetries than macrostructural asymmetries. To investigate the link between microstructure and function, we analyzed multimodal MRI data in 907 participants. We quantified structural and functional

asymmetries of the planum temporale (PT), a cortical area crucial for auditory-language processing. We found associations of functional PT asymmetries and several microstructural asymmetries, such as intracortical myelin content, neurite density, and neurite orientation dispersion. The PT microstructure per se also showed hemispheric-specific coupling with PT functional activity. All these functional-structural associations are highly specific to within-PT functional activity during auditory-language processing. These results suggest that structural asymmetry guides functional lateralization of the same brain area and highlight a critical role of microstructural PT asymmetries in auditory-language processing.
https://elifesciences.org/reviewed-preprints/95547

Evolutionary Anthropology

PAPERS

JOSÉ M. LÓPEZ-REY et al – Eco-geographic and sexual variation of the ribcage in Homo sapiens

Up to now, Allen and Bergmann's rules have been studied in modern humans by analyzing differences in limb length, height, or body mass. However, there are no publications studying the effects of latitude in the 3D configuration of the ribcage. To assess this issue, we digitally reconstructed the ribcages of a balanced sample of 109 adult individuals of global distribution. Shape and size of the ribcage was quantified using geometric morphometrics. Our results show that the ribcage belonging to tropical individuals is smaller and slenderer compared to others living in higher latitudes, which is in line with Allen and Bergmann's rules and suggests an allometric relationship between size and shape. Although sexual dimorphism was observed in the whole sample, significant differences were only found in tropical populations. Our proposal is that, apart from potential sexual selection, avoiding heat loss might be the limiting factor for sexual dimorphism in cold-adapted populations.
https://onlinelibrary.wiley.com/doi/full/10.1002/evan.22040

COMMENTARIES

RICHARD J. SMITH & BERNARD WOOD – On the scientific credibility of paleoanthropology: Reply to Villmoare and Kimbel

Smith and Wood reply to Villmoare and Kimbel regarding the scientific credibility of problems in paleoanthropology that require causal explanations for unique historical events.
https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.22041
Original in EAORC Bulletin 1,097.

Heliyon

PAPERS

BISRAT TEKLESILASSIE YAZEW – Women's Contributions Versus Men's Patriarchal Status Among Afar Pastoralists in the Lower Awash Valley

This study examined women's unrecognized roles in facilitating socio-economic interactions and clan networks in a patriarchal society. A qualitative research methodology was chosen. Situational observations, key interviews, and group discussions were applied as data-gathering tools. A thematic descriptive analysis method was used to examine the data that had been gathered. Accordingly, the study found that women are not participating in leading customary institutions and publicly due to the traditional patriarchal domination. However, the customary law shields women from various presumptions. It has been noted women's participation in maintaining social order, economic reciprocity, and resource sharing. Most importantly, women's continual control of household responsibilities and income-generating activities is essential to Afar society's survival. The study recommends that multifaceted interventions should be made to maintain women's role in supporting their traditional methods of engaging in maintaining clan networks. An intervention should mostly be better focused on women's activities as it will help to explore additional mechanisms that uplift either women by themselves or by the initial intervention system. Therefore, the study recommends incorporating pastoral women's roles into more extensive women's enclave empowerment policies and removing the existing sociocultural limitations to allow them to contribute more to pastoral livelihoods.
https://www.cell.com/heliyon/fulltext/S2405-8440(24)10500-2

TATJANA SCHNELL et al – When Alienated From Society, Conspiracy Theory Belief Gives Meaning to Life

Conspiracy theory belief – explaining the ultimate causes of social and political events with claims of secret conspiracies – is assumed to arise from a desire to make sense of uncertainty, especially in times of crisis. However, there is no compelling evidence that conspiracy theory belief actually fulfils this function, particularly in terms of evaluating one's life as meaningful. We posit that the adoption of conspiracy theory belief can be explained as a fluid compensation when a more proximal source of meaning, a sense of belonging to society, is threatened. Thus, a positive association between conspiracy theory belief and meaningfulness should emerge when people feel alienated from society. We therefore tested the hypotheses that alienation from society correlates negatively with meaningfulness (H1), and that it moderates the relationship between conspiracy theory belief and meaningfulness (H2). Method: Conspiracy theory belief related to the COVID-19 pandemic, meaningfulness (Meaning and Purpose Scales, MAPS), and perceived alienation from society were assessed in a representative sample of N = 974 German residents. Results: As expected, alienation from society was inversely related to

meaningfulness and moderated the relationship between conspiracy theory belief and meaningfulness. According to the interaction, a positive association between belief in conspiracy theory and meaningfulness emerged when individuals experienced themselves as alienated from society. Conclusion: The results suggest that conspiracy theory belief might alleviate a lack of meaningfulness caused by experienced alienation from society. Individuals who felt discriminated against, treated unequally, or having their rights restricted were more likely to hold conspiracy theory belief, which was associated with a greater sense of meaning in their lives.
https://www.cell.com/heliyon/fulltext/S2405-8440(24)10588-9

Nature Africa

ARTICLES

SIBUSISO BIYELA – Study casts doubt on brain grooves' reliability in evolution research
Comparing 3D images of living brains reveals limitations of using skull moulds to glean historic capacity for language and learning
https://www.nature.com/articles/d44148-024-00211-w

Nature Ecology & Evolution

ARTICLES

ZEGNI TRIKI – Scaling up the mammalian brain
An analysis of interspecific brain–body size relationships in mammals finds they do not follow the oft-assumed power-law scaling relationship that leads to a linear relationship when both variables are log-transformed, and reveals instead a curvilinear relationship between brain size and body size.
https://www.nature.com/articles/s41559-024-02468-8

PAPERS

CHRIS VENDITTI, JOANNA BAKER & ROBERT A. BARTON – Co-evolutionary dynamics of mammalian brain and body size
Despite decades of comparative studies, puzzling aspects of the relationship between mammalian brain and body mass continue to defy satisfactory explanation. Here we show that several such aspects arise from routinely fitting log-linear models to the data: the correlated evolution of brain and body mass is in fact log-curvilinear. This simultaneously accounts for several phenomena for which diverse biological explanations have been proposed, notably variability in scaling coefficients across clades, low encephalization in larger species and the so-called taxon-level problem. Our model implies a need to revisit previous findings about relative brain mass. Accounting for the true scaling relationship, we document dramatically varying rates of relative brain mass evolution across the mammalian phylogeny, and we resolve the question of whether there is an overall trend for brain mass to increase through time. We find a trend in only three mammalian orders, which is by far the strongest in primates, setting the stage for the uniquely rapid directional increase ultimately producing the computational powers of the human brain.
https://www.nature.com/articles/s41559-024-02451-3

Nature Reviews Physics

ARTICLES

AILEEN FYFE – The surprising history of abstracts
The abstract as a 200-word summary that readers click through to access a full article is a staple of scientific publishing. But as Aileen Fyfe explains, this is only one of the roles that abstracts have performed in the history of scientific communication.
https://www.nature.com/articles/s42254-024-00741-0.epdf

Nature Scientific Reports

PAPERS

MASINDA NGUIDI et al – Impact of patrilocality on contrasting patterns of paternal and maternal heritage in Central-West Africa
Despite their ancient past and high diversity, African populations are the least represented in human population genetic studies. In this study, uniparental markers (mtDNA and Y chromosome) were used to investigate the impact of sociocultural factors on the genetic diversity and inter-ethnolinguistic gene flow in the three major Nigerian groups: Hausa (n = 89), Yoruba (n = 135) and Igbo (n = 134). The results show a distinct history from the maternal and paternal perspectives. The three Nigerian groups present a similar substrate for mtDNA, but not for the Y chromosome. The two Niger–Congo groups, Yoruba and Igbo, are paternally genetically correlated with populations from the same ethnolinguistic affiliation. Meanwhile, the Hausa is paternally closer to other Afro-Asiatic populations and presented a high diversity of lineages from across Africa. When expanding the analyses to other African populations, it is observed that language did not act as a major barrier to female-mediated gene flow and that the differentiation of paternal lineages is better correlated with linguistic than

geographic distances. The results obtained demonstrate the impact of patrilocality, a common and well-established practice in populations from Central-West Africa, in the preservation of the patrilineage gene pool and in the affirmation of identity between groups.
https://www.nature.com/articles/s41598-024-65428-z

MICHELLE COHN et al – Children and adults produce distinct technology- and human-directed speech
This study compares how English-speaking adults and children from the United States adapt their speech when talking to a real person and a smart speaker (Amazon Alexa) in a psycholinguistic experiment. Overall, participants produced more effortful speech when talking to a device (longer duration and higher pitch). These differences also varied by age: children produced even higher pitch in device-directed speech, suggesting a stronger expectation to be misunderstood by the system. In support of this, we see that after a staged recognition error by the device, children increased pitch even more. Furthermore, both adults and children displayed the same degree of variation in their responses for whether "Alexa seems like a real person or not", further indicating that children's conceptualization of the system's competence shaped their register adjustments, rather than an increased anthropomorphism response. This work speaks to models on the mechanisms underlying speech production, and human–computer interaction frameworks, providing support for routinized theories of spoken interaction with technology.
https://www.nature.com/articles/s41598-024-66313-5

JIE GAO & IKUMA ADACHI – Body part categorical matching in chimpanzees (Pan troglodytes)
Humans categorize body parts, reflecting our knowledge about bodies, and this could be useful in higher-level activities involving bodies. We tested whether humans' closest living relatives—chimpanzees—have the same ability using touchscreen tasks, focusing on the major parts: heads, torsos, arms, and legs. Six chimpanzees were trained to perform a body part matching-to-sample task using sets of pictures of chimpanzee bodies, where in each trial, the sample and choice pictures were the same. Five passed the training and received the test sessions, where three trial types were mixed: trained same-individual picture pairs; novel same-individual picture pairs; and novel different-individual picture pairs. All participants performed better than the chance level in all conditions and for all body parts. Further analyses showed differences in performance when the samples were different body parts. For example, the results revealed better performances for heads and torsos than arms and legs in "novel different-individual pairs". The study showed that chimpanzees can visually match and categorize body parts in this experiment setting, even across different chimpanzees' bodies, suggesting potential biological understanding. Different performances for body parts suggested a deviated categorization from humans. We hope this study will inspire future research on the evolution of body perception.
https://www.nature.com/articles/s41598-024-66829-w

KEVIN IGWE & KEVIN DURRHEIM – Using artificial agents to nudge outgroup altruism and reduce ingroup favoritism in human-agent interaction
Ingroup favoritism and intergroup discrimination can be mutually reinforcing during social interaction, threatening intergroup cooperation and the sustainability of societies. In two studies (N = 880), we investigated whether promoting prosocial outgroup altruism would weaken the ingroup favoritism cycle of influence. Using novel methods of human-agent interaction via a computer-mediated experimental platform, we introduced outgroup altruism by (i) nonadaptive artificial agents with preprogrammed outgroup altruistic behavior (Study 1; N = 400) and (ii) adaptive artificial agents whose altruistic behavior was informed by the prediction of a machine learning algorithm (Study 2; N = 480). A rating task ensured that the observed behavior did not result from the participant's awareness of the artificial agents. In Study 1, nonadaptive agents prompted ingroup members to withhold cooperation from ingroup agents and reinforced ingroup favoritism among humans. In Study 2, adaptive agents were able to weaken ingroup favoritism over time by maintaining a good reputation with both the ingroup and outgroup members, who perceived agents as being fairer than humans and rated agents as more human than humans. We conclude that a good reputation of the individual exhibiting outgroup altruism is necessary to weaken ingroup favoritism and improve intergroup cooperation. Thus, reputation is important for designing nudge agents.
https://www.nature.com/articles/s41598-024-64682-5

New Scientist

NEWS

Ancient Denisovans hunted snow leopards on the Tibetan plateau
Thousands of bones found in a Tibetan cave have been analysed to learn how mysterious ancient humans known as Denisovans lived.
https://www.newscientist.com/article/2437993-ancient-denisovans-hunted-snow-leopards-on-the-tibetan-plateau/

50,000-year-old picture of a pig is the oldest known narrative art
A new radiometric dating technique reveals that cave paintings on Sulawesi, Indonesia, are even older than previously thought, pushing back the earliest evidence of storytelling.
https://www.newscientist.com/article/2438291-50000-year-old-picture-of-a-pig-is-the-oldest-known-narrative-art/

ARTICLES

COLIN BARRAS – Why did humans evolve big brains? A new idea bodes ill for our future
Recent fossil finds suggest that big brains weren't an evolutionary asset to our ancestors but evolved by accident – and are likely to shrink again in the near future.
https://www.newscientist.com/article/mg26334991-100-why-did-humans-evolve-big-brains-a-new-idea-bodes-ill-for-our-future/

PeerJ

PAPERS

IAN TOWLE et al – Assessing tooth wear progression in non-human primates: a longitudinal study using intraoral scanning technology
Intraoral scanners are widely used in a clinical setting for orthodontic treatments and tooth restorations, and are also useful for assessing dental wear and pathology progression. In this study, we assess the utility of using an intraoral scanner and associated software for quantifying dental tissue loss in non-human primates. An upper and lower second molar for 31 captive hamadryas baboons (Papio hamadryas) were assessed for dental tissue loss progression, giving a total sample of 62 teeth. The animals are part of the Southwest National Primate Research Center and were all fed the same monkey-chow diet over their lifetimes. Two molds of each dentition were taken at either two- or three-year intervals, and the associated casts scanned using an intraoral scanner (Medit i700). Tissue loss was calculated in WearCompare by superimposition of the two scans followed by subtraction analysis. Four individuals had dental caries, and were assessed separately. The results demonstrate the reliability of these techniques in capturing tissue loss data, evidenced by the alignment consistency between scans, lack of erroneous tissue gain between scans, and uniformity of tissue loss patterns among individuals (e.g., functional cusps showing the highest degree of wear). The average loss per mm2 per year for all samples combined was 0.05 mm3 (0.04 mm3 for females and 0.08 mm3 for males). There was no significant difference in wear progression between upper and lower molars. Substantial variation in the amount of tissue loss among individuals was found, despite their uniform diet. These findings foster multiple avenues for future research, including the exploration of wear progression across dental crowns and arcades, correlation between different types of tissue loss (e.g., attrition, erosion, fractures, caries), interplay between tissue loss and microwear/topographic analysis, and the genetic underpinnings of tissue loss variation.
https://peerj.com/articles/17614/

PLoS One

PAPERS

LUCAS COLARES et al – Functional diversity in human song
Functional diversity–i.e., the diversity of morphophysiological characteristics of species in a biological community–revolutionized ecology in recent decades, shifting the focus of the field from species to ecosystems. While its ecological applications are known, its adaptability to other disciplines, specifically music, is explored here. We retrieved fourteen characteristics of 12,944 songs by the top 100 artists of the 2010s decade on four streaming platforms. Then, we calculated the three main components of functional diversity–richness, evenness, and divergence–to each artist using probabilistic hypervolumes. Furthermore, we investigated to what extent functional diversity and the traits of an artist, its albums and songs has an effect on their popularity across streaming platforms such as Spotify. High functional richness, where an artist's songs differ greatly sonically, correlated with increased listens of up to 244,300,000. This would lead to estimated profit earnings exceeding $1,000,000 per richness gain. Danceable, highly-energetic, melodic, pop, and, notably, melancholic songs, albums, and artists are more listened to than their counterparts in streaming services. We captured how patterns in human song might reflects the social state of human societies in recent years and demonstrate the potential of applying functional diversity concepts and tools across scientific and economic domains, extending its relevance beyond ecology. By demonstrating applications of state-of-the-art functional diversity metrics using music as a case study, we intent to communicate the often-complex concepts of functional diversity using the familiar realm of music, which is an intrinsic trait of human cultures across the globe.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0307032

ANDREA BONACCHI et al – Measuring Strong, Skillful, Good and Transpersonal Will: The development of the Multidimensional Will Scale
This cross-sectional study aimed to provide a scale to assess different aspects of the will based on Roberto Assagioli's theory. The scale development followed three steps. Step 1 focused on operationalizing the construct and developing the items. It was carried out through several phases of item generation and refinement, resulting in a pool of 38 items. At Step 2 we tested the psychometric properties of the initial 38-item scale with the goal of excluding the items that weakened the structural validity and reliability of the scale. Descriptive, internal consistency, and exploratory factor analyses statistics were computed on a large sample (Sample 1: N = 587; age: M = 21.55, SD = 4.14, 66% female) and they led to a five-dimension model (Strong, Skillful, Good toward Self and Other, and Transpersonal Will) and the exclusion of 15 items. Analyses

conducted at Step 3 on a different sample (Sample 2: N = 683; age: M = 34.09, SD = 16.27, 54% female) allowed for further refinement of the scale. Confirmatory factor analysis conducted on the resulting 19-item scale showed a good fit for the five-factor model ($\chi 2$ (142) = 507.63, p< .001, TLI = .91; CFI = .93; RMSEA = .06 [90%CI: .06–.07]), and evidence of its invariance across genders and ages was provided. Reliability indices (internal consistency and intraclass correlation coefficients) were adequate (ranging from .66 to .83) and correlations with measures of related constructs supported the external validity of the scale.
This study provides researchers, therapists, and counselors with an efficient measurement tool to assess Assagioli's construct of will.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0305477

JARED VASIL, CAMRYN CAPOOT & MICHAEL TOMASELLO – Effects of group entitativity on young English-speaking children's interpretation of inclusive We
The pronoun we can be used to refer to various collections of people depending on various pragmatic factors. This article reports the results of two online experiments that investigated children's interpretation of inclusive we, in which the child-listener is part of the intended referent of we. 128 2- and 4-year-olds collaborated with three partners in a coloring task. Before they played together, one partner informed participants that, e.g., "we can color!" Participants had their own markers and had to choose to how many partners to distribute (virtual) markers. In the first experiment, the partners appeared more like an aggregation of individuals than a collaborative group. The second experiment flipped this so that the partners appeared more like a collaborative group. Contrary to expectations, there was relatively little evidence for development in children's interpretation of we. Additionally, participants did not sharply distinguish their interpretations of we from those of we both or we all. Rather, participants were more likely to choose group interpretations when contextual cues indicated that their partners were a collaborative group than an aggregation of individuals. Interestingly, this interpretational distinction was sharpest for the pragmatically ambiguous we, compared to the relatively unambiguous we both and we all. These results are informative about the kinds of cues that shape young children's interpretation of pragmatically ambiguous pronominal reference.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0306556

JAKOB HANSEN et al – Combining traceological analysis and ZooMS on Early Neolithic bone artefacts from the cave of Coro Trasito, NE Iberian Peninsula: Cervidae used equally to Caprinae
Few studies have combined the analysis of use-wear traces, traceology, and the proteomic taxonomic identification method Zooarchaeology by Mass Spectrometry (ZooMS). Traceology provides information on the usage, in this case, of bone artefacts, while ZooMS allows for taxonomic identifications where diagnostic features are otherwise gone. The approaches therefore offer complementary information on bone artefacts, allowing for insights into species selection strategies in bone tool manufacture and their subsequent use. Here we present a case study of 20 bone artefacts, mainly bone points, from the Early Neolithic cave site of Coro Trasito located on the southern slope of the Central Pyrenees. Hitherto, studies on Early Neolithic bone artefacts from the Iberian Peninsula have suggested based on morphological assessments that Ovis aries/Capra hircus constituted the majority of the bone material selected for bone tool production. However, the taxonomic identification in this study suggests that, at this site, Cervidae was selected equally to that of O. aries/C. hircus. Furthermore, bone artefacts made from Cervidae specimens seem to be utilised in a wider range of artefact types compared to O. aries/C. hircus. Coro Trasito's bone artefact species composition is probably site-specific to some degree, however, morphological assessments of bone artefacts might not be representative and could be biased towards certain species. Therefore, research on bone artefacts' usage could possibly gain new insights by implementing ZooMS in combination with traceology.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0306448

Proceedings of the Royal Society B

PAPERS

STEVEN T. GOLDSTEIN et al – Early agriculture and crop transitions at Kakapel Rockshelter in the Lake Victoria region of eastern Africa
The histories of African crops remain poorly understood despite their contemporary importance. Integration of crops from western, eastern and northern Africa probably first occurred in the Great Lakes Region of eastern Africa; however, little is known about when and how these agricultural systems coalesced. This article presents archaeobotanical analyses from an approximately 9000-year archaeological sequence at Kakapel Rockshelter in western Kenya, comprising the largest and most extensively dated archaeobotanical record from the interior of equatorial eastern Africa. Direct radiocarbon dates on carbonized seeds document the presence of the West African crop cowpea (Vigna unguiculata (L.) Walp) approximately 2300 years ago, synchronic with the earliest date for domesticated cattle (Bos taurus). Peas (Pisum sativum L. or Pisum abyssinicum A. Braun) and sorghum (Sorghum bicolor (L.) Moench) from the northeast and eastern African finger millet (Eleusine coracana (L.) Gaertn.) are incorporated later, by at least 1000 years ago. Combined with ancient DNA evidence from Kakapel and the surrounding region, these data support a scenario in which the use of diverse domesticated species in eastern Africa changed over time rather than arriving and being maintained as a single package. Findings highlight the importance of local heterogeneity in shaping the spread of food production in sub-Saharan Africa.

https://royalsocietypublishing.org/doi/10.1098/rspb.2023.2747

Royal Society Open Science

PAPERS

ALEXANDRA L. J. FREEMAN et al – Can narrative help people engage with and understand information without being persuasive? An empirical study

Stories have been shown to be engaging and aid the comprehension and retention of information. However, the persuasive power of storytelling is well-recognized. Is this an inherent property? Can a narrative be constructed that helps people engage with information but does not persuade them? We presented participants (n = 1309) with information about a fictional new drug and asked them whether they would license it on the basis of this. All saw the same information, in either a bullet-pointed list or as a 'process narrative'—a journalist's 'journey of discovery', designed to avoid persuasive language. Participants rated the narrative format a little more engaging than the non-narrative ($p = 0.033$, $d = 0.12$) and remembered the information in it slightly better ($p = 0.040$, $d = 0.11$). They did not rate the narrative version as more persuasive, but those reading it were on average more opposed to licensing the drug than those reading the non-narrative ($p < 0.001$, $d = 0.18$). Based on participants' responses to other questions, we speculate this may be owing to the increased salience of risks of the drug, arising from subtle differences in wording. Thus, while narratives may have useful properties, they must be carefully constructed to avoid unintentional effects.
https://royalsocietypublishing.org/doi/10.1098/rsos.231708

SAAR EGOZI & YOAV RAM – Prestige bias in cultural evolutionary dynamics

If the traits of more successful individuals are more likely to be adopted, the resulting cultural transmission is described as success biased. In contrast, if the traits of 'prestigious' individuals—those who have already been copied many times—are more likely to be adopted, this is described as prestige-biased cultural transmission. In this case, prestige can be a convenient proxy for success. However, it is unclear how success and prestige biases interact to determine the outcome of cultural evolutionary dynamics. Here, we aim to clarify this using mathematical analysis and stochastic simulations. We find analytic approximations to the stochastic role-model choice process that facilitate the mathematical analysis and reduce the computational complexity of simulations. Approximations are given to the fixation probability and the fixation time of an invading cultural trait in different environments. Our results show that success bias effectively plays the role of natural selection, whereas prestige bias effectively plays the role of genetic drift. Prestige bias, which may be strong in highly social communities, also accelerates the evolutionary dynamics, as expected in a rich-get-richer process. These results signify a step forward in understanding how different cultural transmission biases interact.
https://royalsocietypublishing.org/doi/10.1098/rsos.230650

Science

NEWS

Neanderthals and modern humans mingled early and often

Ancient DNA study gives a Neanderthal-eye view of prehistory, offers clues to how our cousins vanished.
https://www.science.org/content/article/neanderthals-and-modern-humans-mingled-early-and-often

PAPERS

LIMING LI et al – Recurrent gene flow between Neanderthals and modern humans over the past 200,000 years

For much of modern human history, we were only one of several different groups of hominins that existed. Studies of ancient and modern DNA have shown that admixture occurred multiple times among different hominin lineages, including between the ancestors of modern humans and Neanderthals. A number of methods have been developed to identify Neanderthal-introgressed sequences in the DNA of modern humans, which have provided insight into how admixture with Neanderthals shaped the biology and evolution of modern human genomes. Although gene flow from an early modern human population to Neanderthals has been described, the consequences of admixture on the Neanderthal genome have received comparatively less attention.

A better understanding of how admixture with modern humans influenced patterns of Neanderthal genomic variation may provide insights into hominin evolutionary history. For example, DNA sequences inherited from modern human ancestors in Neanderthals can be used to test hypotheses on the frequency, magnitude, and timing of admixture and the population genetics characteristics of Neanderthals. Introgressed modern human sequences in Neanderthals can also be used to refine estimates of Neanderthal ancestry in contemporary individuals. We developed a simple framework to investigate introgressed human sequences in Neanderthals that is predicated on the expectation that sequences inherited from modern human ancestors would be, on average, more genetically diverse and would result in local increases in heterozygosity across the Neanderthal genome.

We first used a method referred to as IBDmix to identify introgressed Neanderthal sequences in 2000 modern humans sequenced by the 1000 Genomes Project. We found that sequences identified by IBDmix as Neanderthal in African individuals from the 1000 Genomes Project are significantly enriched in regions of high heterozygosity in the Neanderthal

genome, whereas no such enrichment is observed with sequences detected as introgressed in non-African individuals. We show that these patterns are caused by gene flow from modern humans to Neanderthals and estimate that the Vindija and Altai Neanderthal genomes have 53.9 Mb (2.5%) and 80.0 Mb (3.7%) of human-introgressed sequences, respectively. We leverage human-introgressed sequences in Neanderthals to revise estimates of the amount of Neanderthal-introgressed sequences in modern humans. Additionally, we show that human-introgressed sequences cause Neanderthal population size to be overestimated and that accounting for their effects decrease estimates of Neanderthal population size by ~20%. Finally, we found evidence for two distinct epochs of human gene flow into Neanderthals.
Our results provide insights into the history of admixture between modern humans and Neanderthals, show that gene flow had substantial impacts on patterns of modern human and Neanderthal genomic variation, and show that accounting for human-introgressed sequences in Neanderthals enables more-accurate inferences of admixture and its consequences in both Neanderthals and modern humans. More generally, the smaller estimated population size and inferred admixture dynamics are consistent with a Neanderthal population that was decreasing in size over time and was ultimately being absorbed into the modern human gene pool.
https://www.science.org/doi/10.1126/science.adi1768

Science Advances

ARTICLES

GLORIA MATTE BON, DOMINIK KRAFT & TOBIAS KAUFMANN – How sex and gender shape functional brain networks
For many years, the neurosciences have operated with a blind spot when it comes to investigating the roles of sex and gender in study samples. This might be particularly harmful in the clinical neurosciences, as we know that substantial sex differences exist in the prevalence, timing, and clinical presentation of many common brain disorders across the life span. For example, autism spectrum disorder and Parkinson's disease are more common in males than in females, whereas depression, migraine, and Alzheimer's disease are more common in females than in males. Because the sources of sex differences are poorly understood, basing research and clinical care on a one-sex-fits-all approach calls into question the validity of such an approach.
https://www.science.org/doi/10.1126/sciadv.adq3079

PAPERS

ELVISHA DHAMALA et al – Functional brain networks are associated with both sex and gender in children
Sex and gender are associated with human behavior throughout the life span and across health and disease, but whether they are associated with similar or distinct neural phenotypes is unknown. Here, we demonstrate that, in children, sex and gender are uniquely reflected in the intrinsic functional connectivity of the brain. Somatomotor, visual, control, and limbic networks are preferentially associated with sex, while network correlates of gender are more distributed throughout the cortex. These results suggest that sex and gender are irreducible to one another not only in society but also in biology.
https://www.science.org/doi/10.1126/sciadv.adn4202

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