

EAORC BULLETIN 1,080 – 25 February 2024

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NOTICES

PUBLICATION ALERTS

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

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

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

EDITORIAL INTERJECTIONS

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

ACADEMIA.EDU – Behavioural Complexity in Eurasian Neanderthal Populations

In Cognition and Communication in the Evolution of Language, Oxford University Press, 59-114, ch3 (2017).

MICHELLE C. LANGLEY, CHRISTOPHER CLARKSON & SEAN ULM – Behavioural Complexity in Eurasian Neanderthal Populations: A Chronological Examination of the Archaeological Evidence

Whether Neanderthals were capable of behaviours commonly held to be the exclusive preserve of modern humans — such as abstract thought, language, forward planning, art, reverence of the dead, complex technology, etc. — has remained a fundamental question in human evolutionary studies since their discovery more than a hundred years ago. A lack of quantitative data on Neanderthal symbolism and complex behaviour is a key obstacle to the resolution of this question, with temporal analyses usually confined to single regions or short time periods. Here we present an approach to the issue of symbolism and complex behaviours among Neanderthals that examines the frequency of key proxies for symbolic and complex behaviours through time, including burials, modified raw materials, use of pigments, use of composite technology and body modification. Our analysis demonstrates that the number and diversity of complex Neanderthal behaviours increases between 160,000 and 40,000 years ago. Whether this pattern derives from preservation factors, the evolution of cognitive and behavioural complexity, cumulative learning, or population size is discussed. We take the view that it is not the apparent sophistication of a single specific item, nor the presence or absence of particular types in the archaeological record that is important. Instead, we believe that it is the overall abundance of artefacts and features indicative of complex behaviours within the Neanderthal archaeological record as a whole that should provide the mark of Neanderthal capabilities and cultural evolutionary potential.

https://www.academia.edu/412485/Behavioural_complexity_in_Eurasian_Neanderthal_populations_A_chronological_examination_of_the_archaeological_evidence

LECTURE ALERT – Cedric Boeckx on 'Hunter-gatherers of words'

Tuesday 5 March, 6:30pm.

The Daryll Forde Room, 2nd Floor of the UCL Anthropology Dept, 14 Taviton St., London, WC1H 0BW.

You can also join on ZOOM (ID 384 186 2174 Passcode Wawilak).

Cedric Boeckx is Research Professor at the Catalan Institute for Advanced Studies (ICREA). His current research focuses on developing new ways to shed light on the neurobiological foundations of the human language faculty.

Hunter-gatherers of words – Abstract

A lot of attention has been paid to the combinatorial aspects of human language and how they may have evolved. Comparatively less attention has been devoted to the units of combination, the “words”. I’ll argue that asking evolutionary questions about “words” enables us to touch on broader questions about our cognitive make-up and, crucially, the communities in which language acquisition/use takes place. Examining the prerequisites that a rich symbolic culture imposes helps us probe further the nature of prosociality (and its limits) in our species.

This should be of interest for a range of disciplines including cognitive archaeology, anthropology, linguistics, neuroscience, evolutionary biology, genetics etc. Hoping you can join us LIVE or online.

N.B. if the front of the Anthro building is still under repair, please use the main entrance of the Archaeology Institute round the corner in Gordon Square.

Camilla Power, Research Fellow

NEWS

NATURE BRIEFING – Great ‘Stone Age’ wall discovered

A string of boulders almost a kilometre long, now covered by the Baltic Sea, could be Europe’s oldest human-made megastructure. Researchers say the “pristine” discovery was probably used for hunting the Eurasian reindeer more than 10,000 years ago. Before it was submerged by rising sea levels about 8,500 years ago, hunters might have used the wall to force prey into a bottleneck or a nearby lake.

<https://www.theguardian.com/science/2024/feb/12/stone-age-wall-found-at-bottom-of-baltic-sea-may-be-europes-oldest-megastructure>

SAPIENS – Finding Footprints Laid at the Dawn of Time

In the Brazilian Amazon, a university-trained archaeologist and Wajãpi Indigenous people understand traces from the past differently—but their partnership bears fruit for both.

<https://www.sapiens.org/archaeology/indigenous-knowledge-archaeology-amazon-brazil/>

SAPIENS – What’s Behind the Evolution of Neanderthal Portraits

Since the 1800s, Neanderthal depictions have evolved not only with changing science but also due to social views. An archaeologist explains why visualizations of our evolutionary cousins matter.

<https://www.sapiens.org/archaeology/neanderthal-art-paleolithic-archaeology/>

SCIENCEADVISER – Ochre-based glue helped Neanderthals get a grip

When researchers at a Berlin museum decided to reexamine a set of stone tools that had sat untouched in their collection since the 1960s, they were surprised to discover several items covered in curious red and yellow stains. Further analysis of the tools, which were crafted some 40,000 years ago by ancient human relatives in what is now southwestern France, revealed traces of bitumen—a sticky substance used to make asphalt—and a naturally occurring pigment called ochre.

<https://www.science.org/doi/10.1126/sciadv.adl0822>

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

GIORGIA VINCENTI et al – Female biased adult sex ratio in the Bronze Age cemetery of Shahr-i Sokhta (Iran) as an indicator of long distance trade and matrilocality

This paper starts from the unusual observation of the overrepresentation of females among adults in the cemetery of Bronze Age Shahr-i Sokhta (Seistan, Iran) and explores the post marital residence pattern. By integrating taphonomical (skeletal preservation), anthropological (sex ratio [SR], sexual dimorphism, stress indicators, age at death), archeological (long distance trade indicators, habitation floor area, social role of women), and ancient DNA (heterozygosity levels in X chromosomes) data we test the hypothesis of post marital matrilocality in the site.

We computed the SR (pelvis-based sex determination) in a random unpublished adult sample from the cemetery of Shahr-i Sokhta and in two samples previously published by other authors. We used comparative data on SR from: a large Supra Regional multi-chronological sample of sites, $n = 47$, with 8808 adult sexed individuals, from Southern Europe, Egypt, Middle East, Southern Russia; a Regional Bronze Age sample of sites ($n = 10$) from Bactria Margiana and Indus Valley with 1324 adult sexed individuals. We estimated the heterozygosity levels in X chromosomes compared with the rest of the autosomes on the assumption that in a matrilocality society females should show lower variability than men.

Adult SR in a sample ($n = 549$) from Shahr-i Sokhta is 70.5, the overrepresentation of females is shared with Regional Bronze Age sites from Bactria Margiana (SR = 72.09) and Indus Valley (SR = 67.54). On the contrary, in a larger Supra Regional multi-chronological sample of sites, mean SR ranges between 112.7 (Bronze Age) and 163.1 (Middle Ages). Taphonomical and anthropological indicators do not explain the overrepresentation of female skeletons. Archeological indicators suggest a high social status of women and that the society was devoted to long range trade activities. heterozygosity levels in X chromosomes are in agreement with a matrilocality society.

Indicators suggest that Bronze Age Shahr-i Sokhta was a matrilocality society and that long distance trade was an important economic factor producing an overrepresentation of adult female skeletons in the cemetery.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24911>

Cell

PAPERS

HUGO ZEBERG, MATTIAS JAKOBSSON & SVANTE PÄÄBO – The genetic changes that shaped Neandertals, Denisovans, and modern humans

Modern human ancestors diverged from the ancestors of Neandertals and Denisovans about 600,000 years ago. Until about 40,000 years ago, these three groups existed in parallel, occasionally met, and exchanged genes. A critical question is why modern humans, and not the other two groups, survived, became numerous, and developed complex cultures. Here, we discuss genetic differences among the groups and some of their functional consequences. As more present-day genome sequences become available from diverse groups, we predict that very few, if any, differences will distinguish all modern humans from all Neandertals and Denisovans. We propose that the genetic basis of what constitutes a modern human is best thought of as a combination of genetic features, where perhaps none of them is present in each and every present-day individual.

[https://www.cell.com/cell/abstract/S0092-8674\(23\)01403-4](https://www.cell.com/cell/abstract/S0092-8674(23)01403-4)

CAROLINE I. JAHN et al – Learning attentional templates for value-based decision-making

Attention filters sensory inputs to enhance task-relevant information. It is guided by an “attentional template” that represents the stimulus features that are currently relevant. To understand how the brain learns and uses templates, we trained monkeys to perform a visual search task that required them to repeatedly learn new attentional templates. Neural recordings found that templates were represented across the prefrontal and parietal cortex in a structured manner, such that perceptually neighboring templates had similar neural representations. When the task changed, a new attentional

template was learned by incrementally shifting the template toward rewarded features. Finally, we found that attentional templates transformed stimulus features into a common value representation that allowed the same decision-making mechanisms to deploy attention, regardless of the identity of the template. Altogether, our results provide insight into the neural mechanisms by which the brain learns to control attention and how attention can be flexibly deployed across tasks.

[https://www.cell.com/cell/fulltext/S0092-8674\(24\)00110-7](https://www.cell.com/cell/fulltext/S0092-8674(24)00110-7)

Current Anthropology

PAPERS

LAWRENCE ROSEN – “My Culture Made Me Do It”: Free Will and the Expert Witness’s Dilemma

At the core of many legal cases involving cultural background is the question of an individual’s freedom to act contrary to the norms of his or her culture. Particularly in criminal cases the question is: Shall the individual, raised in a given culture, be seen as possessing unrestricted free will? Alternatively, are individuals essentially limited in their choices by their culture or forced to choose between cultural attachment and cultural alienation? When experts testify as to cultural context, what theories of free will versus cultural constraint do they exemplify? How do anthropologists’ theories square with those of psychologists, geneticists, or neuroscientists addressing the same issues? In the absence of expert guidance, what assumptions do courts bring to bear on the relation of culture to free will? By looking at the approaches anthropologists have taken to these questions, we can initiate a much-needed conversation about the dilemma an expert faces in court when confronted with issues of free will.

<https://www.journals.uchicago.edu/doi/abs/10.1086/728719?af=R>

eLife

PAPERS

KATHERINE RICKELTON et al with CHET C SHERWOOD – Tempo and mode of gene expression evolution in the brain across primates

Primate evolution has led to a remarkable diversity of behavioral specializations and pronounced brain size variation among species (Barton, 2012; DeCasien and Higham, 2019; Powell et al., 2017). Gene expression provides a promising opportunity for studying the molecular basis of brain evolution, but it has been explored in very few primate species to date (e.g. Khaitovich et al., 2005; Khrameeva et al., 2020; Ma et al., 2022; Somel et al., 2009). To understand the landscape of gene expression evolution across the primate lineage, we generated and analyzed RNA-seq data from four brain regions in an unprecedented eighteen species. Here, we show a remarkable level of variation in gene expression among hominid species, including humans and chimpanzees, despite their relatively recent divergence time from other primates. We found that individual genes display a wide range of expression dynamics across evolutionary time reflective of the diverse selection pressures acting on genes within primate brain tissue. Using our samples that represent a 190-fold difference in primate brain size, we identified genes with variation in expression most correlated with brain size. Our study extensively broadens the phylogenetic context of what is known about the molecular evolution of the brain across primates and identifies novel candidate genes for the study of genetic regulation of brain evolution.

<https://elifesciences.org/articles/70276>

Frontiers in Psychology

PAPERS

EIRIMAS VELIČKA – Lithuanian polyphonic songs sutartinės: the archaic nature of their musical language in the context of global music

Lithuanian traditional polyphonic songs, known as sutartinės, are characterized by a distinctive musical language and have almost no analogues in world music. The aim of this article is to explore the peculiarities of their musical language and the socio-cultural context of their performance tradition in order to reveal their archaic origins. The archaic nature of sutartinės songs is shown not by individual features of their musical language, but by the totality of these features, the peculiarities of their poetics, and performance traditions. An examination of the musical elements and poetry of these songs, and their juxtaposition against examples of archaic vocal polyphony from other cultures, leads to the convergence of arguments in favour of the very ancient origins of these songs, possibly dating back to Old Europe (c. 3 millennium BC). A deeper insight into sutartinės songs significantly enriches our understanding of the origin and development of traditional vocal polyphony.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1285394/full>

Language Sciences

PAPERS

PETER GÄRDENFORS – Event structure, force dynamics and verb semantics

This article presents a cognitive model of event structure that can be used to explain several features of the semantics of verbs. The model consists of four basic components: agent, patient, force vector and result vector. Each component is

described in terms of the theory of conceptual spaces. The force vector is the cause of the result vector. Unlike other event models both the cause and the effect are included in the representation of a single event.

The model is used for two central topics. Firstly, to provide a force dynamic representation of causation. Secondly, to give a unified analysis of Aktionsart in terms of different forms of vectors, using force diagrams that are extensions of those used by Croft and others. It is then shown that the event model can be used to derive a variety of semantic features of verbs. In particular, I analyze manner-result complementarity, the ambiguity of the passive participle, and the role of goals (telicity).

<https://www.sciencedirect.com/science/article/pii/S038800012300075X>

Nature

NEWS

Ancient bronze hand's inscription points to origins of Basque language

Text on an artefact found in northern Spain resembles a present-day Basque word that means 'of good fortune'.

<https://www.nature.com/articles/d41586-024-00507-9>

Mind-reading devices are revealing the brain's secrets

Implants and other technologies that decode neural activity can restore people's abilities to move and speak — and help researchers to understand how the brain works.

<https://www.nature.com/articles/d41586-024-00481-2>

ARTICLES

BENJAMIN THOMPSON & NICK PETRIĆ HOWE – Why are we nice? Altruism's origins are put to the test [podcast]

Research suggests a combination of behaviours underlie the evolution of human cooperation, and researchers make an optical disc with enormous storage capacity.

<https://www.nature.com/articles/d41586-024-00539-1>

SARAH MATHEW – Why reciprocity is common in humans but rare in other animals

Reciprocal cooperation can be advantageous, but why it is more common in humans than in other social animals is a puzzle. A modelling and experimental study pinpoints the conditions needed for reciprocity to evolve.

<https://www.nature.com/articles/d41586-024-00308-0>

PAPERS

CHARLES EFFERSON, HELEN BERNHARD, URS FISCHBACHER & ERNST FEHR – Super-additive cooperation

Repeated interactions provide an evolutionary explanation for one-shot human cooperation that is counterintuitive but orthodox. Intergroup competition provides an explanation that is intuitive but heterodox. Here, using models and a behavioural experiment, we show that neither mechanism reliably supports cooperation. Ambiguous reciprocity, a class of strategies that is generally ignored in models of reciprocal altruism, undermines cooperation under repeated interactions. This finding challenges repeated interactions as an evolutionary explanation for cooperation in general, which further challenges the claim that repeated interactions in the past can explain one-shot cooperation in the present. Intergroup competitions also do not reliably support cooperation because groups quickly become extremely similar, which limits scope for group selection. Moreover, even if groups vary, group competitions may generate little group selection for multiple reasons. Cooperative groups, for example, may tend to compete against each other. Whereas repeated interactions and group competitions do not support cooperation by themselves, combining them triggers powerful synergies because group competitions constrain the corrosive effect of ambiguous reciprocity. Evolved strategies often consist of cooperative reciprocity with ingroup partners and uncooperative reciprocity with outgroup partners. Results from a behavioural experiment in Papua New Guinea fit exactly this pattern. They thus suggest neither an evolutionary history of repeated interactions without group competition nor a history of group competition without repeated interactions. Instead, our results suggest social motives that evolved under the joint influence of both mechanisms.

<https://www.nature.com/articles/s41586-024-07077-w>

Nature Communications

PAPERS

RAJA MARJIEH et al – Timbral effects on consonance disentangle psychoacoustic mechanisms and suggest perceptual origins for musical scales

The phenomenon of musical consonance is an essential feature in diverse musical styles. The traditional belief, supported by centuries of Western music theory and psychological studies, is that consonance derives from simple (harmonic) frequency ratios between tones and is insensitive to timbre. Here we show through five large-scale behavioral studies, comprising 235,440 human judgments from US and South Korean populations, that harmonic consonance preferences can be reshaped by timbral manipulations, even as far as to induce preferences for inharmonic intervals. We show how such effects may suggest perceptual origins for diverse scale systems ranging from the gamelan's slendro scale to the tuning of Western mean-

tone and equal-tempered scales. Through computational modeling we show that these timbral manipulations dissociate competing psychoacoustic mechanisms underlying consonance, and we derive an updated computational model combining liking of harmonicity, disliking of fast beats (roughness), and liking of slow beats. Altogether, this work showcases how large-scale behavioral experiments can inform classical questions in auditory perception.

<https://www.nature.com/articles/s41467-024-45812-z>

Nature Molecular Psychiatry

PAPERS

TYLER C. MCFAYDEN et al with THE IBIS NETWORK – White matter development and language abilities during infancy in autism spectrum disorder

White matter (WM) fiber tract differences are present in autism spectrum disorder (ASD) and could be important markers of behavior. One of the earliest phenotypic differences in ASD are language atypicalities. Although language has been linked to WM in typical development, no work has evaluated this association in early ASD. Participants came from the Infant Brain Imaging Study and included 321 infant siblings of children with ASD at high likelihood (HL) for developing ASD; 70 HL infants were later diagnosed with ASD (HL-ASD), and 251 HL infants were not diagnosed with ASD (HL-Neg). A control sample of 140 low likelihood infants not diagnosed with ASD (LL-Neg) were also included. Infants contributed expressive language, receptive language, and diffusion tensor imaging data at 6-, 12-, and 24 months. Mixed effects regression models were conducted to evaluate associations between WM and language trajectories. Trajectories of microstructural changes in the right arcuate fasciculus were associated with expressive language development. HL-ASD infants demonstrated a different developmental pattern compared to the HL-Neg and LL-Neg groups, wherein the HL-ASD group exhibited a positive association between WM fractional anisotropy and language whereas HL-Neg and LL-Neg groups showed weak or no association. No other fiber tracts demonstrated significant associations with language. In conclusion, results indicated arcuate fasciculus WM is linked to language in early toddlerhood for autistic toddlers, with the strongest associations emerging around 24 months. To our knowledge, this is the first study to evaluate associations between language and WM development during the pre-symptomatic period in ASD.

<https://www.nature.com/articles/s41380-024-02470-3>

Nature Reviews Psychology

ARTICLES

MARIKA GOBBO – Approaching the neuroscience of language

Language enables humans to communicate, share ideas, and express feelings and emotions. When I approached the study of the relationship between language and the brain, I was fascinated by the brain's wonderful and precisely orchestrated functioning.

<https://www.nature.com/articles/s44159-024-00290-4>

PAPERS

HONGBO YU et al – A levels-of-analysis framework for studying social emotions

Social emotions such as guilt and gratitude serve adaptive functions critical to social interactions and relationships. Therefore, an ecologically valid approach to studying the psychological and neural mechanisms of social emotions is to elicit and measure them in social interactive contexts, where relevant adaptive goals and functions are salient. However, multiple psychological and neurocognitive processes might be simultaneously activated during real-time social interactions: traditional observation-based tasks and self-report measures alone are not sufficient to capture and dissociate these processes. In this Perspective, we draw on Marr's levels-of-analysis framework to argue that a holistic consideration of the goals and functions of a social emotion (computation level), formal modelling of its underlying cognitive operations (algorithm level), and neuroscientific measures of the biological bases of these cognitive operations (implementation level) will afford the theoretical frameworks and methodological tools necessary to advance understanding of social emotions. To support this argument, we describe research that showcases the utility of creative combinations of interactive tasks, neural and behavioural measures, and computational modelling for advancing understanding of how social emotions arise and achieve their adaptive goals and functions.

<https://www.nature.com/articles/s44159-024-00285-1>

Nature Scientific Reports

PAPERS

NORA SHOAIIP et al – A dynamic fuzzy rule-based inference system using fuzzy inference with semantic reasoning

The challenge of making flexible, standard, and early medical diagnoses is significant. However, some limitations are not fully overcome. First, the diagnosis rules established by medical experts or learned from a trained dataset prove static and too general. It leads to decisions that lack adaptive flexibility when finding new circumstances. Secondly, medical terminological interoperability is highly critical. It increases realism and medical progress and avoids isolated systems and the difficulty of data exchange, analysis, and interpretation. Third, criteria for diagnosis are often heterogeneous and changeable. It includes

symptoms, patient history, demographic, treatment, genetics, biochemistry, and imaging. Symptoms represent a high-impact indicator for early detection. It is important that we deal with these symptoms differently, which have a great relationship with semantics, vary widely, and have linguistic information. This negatively affects early diagnosis decision-making. Depending on the circumstances, the diagnosis is made solo on imaging and some medical tests. In this case, although the accuracy of the diagnosis is very high, can these decisions be considered an early diagnosis or prove the condition is deteriorating? Our contribution in this paper is to present a real medical diagnostic system based on semantics, fuzzy, and dynamic decision rules. We attempt to integrate ontology semantics reasoning and fuzzy inference. It promotes fuzzy reasoning and handles knowledge representation problems. In complications and symptoms, ontological semantic reasoning improves the process of evaluating rules in terms of interpretability, dynamism, and intelligence. A real-world case study, ADNI, is presented involving the field of Alzheimer's disease (AD). The proposed system has indicated the possibility of the system to diagnose AD with an accuracy of 97.2%, 95.4%, 94.8%, 93.1%, and 96.3% for AD, LMCI, EMCI, SMC, and CN respectively.

<https://www.nature.com/articles/s41598-024-54065-1>

CECILIE S. TRABERG et al – The persuasive effects of social cues and source effects on misinformation susceptibility

Although misinformation exposure takes place within a social context, significant conclusions have been drawn about misinformation susceptibility through studies that largely examine judgements in a social vacuum. Bridging the gap between social influence research and the cognitive science of misinformation, we examine the mechanisms through which social context impacts misinformation susceptibility across 5 experiments (N = 20,477). We find that social cues only impact individual judgements when they influence perceptions of wider social consensus, and that source similarity only biases news consumers when the source is high in credibility. Specifically, high and low engagement cues ('likes') reduced misinformation susceptibility relative to a control, and endorsement cues increased susceptibility, but discrediting cues had no impact. Furthermore, political ingroup sources increased susceptibility if the source was high in credibility, but political outgroup sources had no effect relative to a control. This work highlights the importance of studying cognitive processes within a social context, as judgements of (mis)information change when embedded in the social world. These findings further underscore the need for multifaceted interventions that take account of the social context in which false information is processed to effectively mitigate the impact of misinformation on the public.

<https://www.nature.com/articles/s41598-024-54030-y>

SARA CONFORTI et al – The metrics of reading speed: understanding developmental dyslexia

We compared reading words and pseudo-words presented in single displays (as typical of psycholinguistic research) with stimuli presented in multiple displays (as typical of real-life conditions and clinical testing) under controlled conditions. Italian sixth-grade children with and without a reading deficit showed an advantage in reading times for multiple over single displays. This finding was partly ascribed to the capacity to overlap the non-decisional component of the response, an effect present in control readers as well as children with dyslexia. Furthermore, there were several indications in the data that the requirement to read sequentially taxes performance by augmenting the relative impact of the experimental manipulations used. This effect was present in both groups of children, but proportionally stronger in children with dyslexia. The study contributes to filling the gap between single and multiple displays, a condition more like real-life situations.

<https://www.nature.com/articles/s41598-024-52330-x>

RAQUEL GÓMEZ-LEAL et al – The Dark Tetrad: analysis of profiles and relationship with the Big Five personality factors

The Dark Tetrad (DT) is composed of the traits of Narcissism, Machiavellianism, Psychopathy, and Sadism. Most studies analyzing the DT have employed a variable-centered approach, analyzing the traits separately. In the present study, we treat DT as a whole, adopting a person-centered approach. We analyzed different homogeneous subgroups of individuals characterized by specific DT profiles, aiming to examine their relationship with Big Five personality factors. A sample of 1149 participants (50.1% women, 18–79 years) completed The Short Dark Triad and the Assessment of Sadistic Personality instrument to assess DT, while the Mini-IPIP was used to assess the Big Five personality factors. Cluster analysis yielded five groups: Narcissism, Machiavellianism, Mean DT, Low DT, and High DT group. The main results showed that the High DT group was distinguished by higher levels of extraversion and lower levels of agreeableness and conscientiousness (compared with the Low DT group). Moreover, the Narcissism group was characterized by higher scores on emotional stability, openness to experience, and extraversion. Finally, distribution according to gender varied across DT groups (more men than women in the High DT group and the opposite in the Low DT group). Limitations and future lines of research are discussed.

<https://www.nature.com/articles/s41598-024-55074-w>

New Scientist

NEWS

Understanding sex differences in the brain is vital to mental health

Whether the male and female brains diverge is a matter of great debate, but untangling the answer could be key to treating common mental health conditions. It could also reveal why certain health conditions seem to affect more men than women, such as autism and ADHD.

<https://www.newscientist.com/article/mg26134794-100-understanding-sex-differences-in-the-brain-is-vital-to-mental-health/>

ARTICLES

THOMAS LEWTON – Is the human brain really the most complex object in the universe?

There are 86 billion neurons in your brain, roughly the same number as there are galaxies in the observable universe. Whether the mind is more complex than the cosmos, however, is up for debate.

<https://www.newscientist.com/article/mg26134792-100-is-the-human-brain-really-the-most-complex-object-in-the-universe/>

ALEX WILKINS – Why forgetting things is a key part of the way your brain works

Forgetfulness can be frustrating, but cognitive scientists reckon it underpins the brain's capacity to efficiently process sensory information – and its unique ability to generalise our knowledge.

<https://www.newscientist.com/article/mg26134792-000-why-forgetting-things-is-a-key-part-of-the-way-your-brain-works/>

TOM LESLIE – The hidden evolutionary advantages of the teenage brain

Recent research suggests teenagers' brains are particularly suited to coping with volatility and new experiences, including socialising and venturing to unknown places.

<https://www.newscientist.com/article/mg26134791-800-the-hidden-evolutionary-advantages-of-the-teenage-brain/>

KARMELA PADAVIC-CALLAGHAN – How entropy and equilibrium can help explain consciousness

Thinking about consciousness from the perspective of a physicist may be key to figuring out whether it is a single phenomenon or a collection of discrete states.

<https://www.newscientist.com/article/mg26134791-700-how-entropy-and-equilibrium-can-help-explain-consciousness/>

CLARE WILSON – New evidence finally reveals how male and female brains really differ

Research is cutting through historical discrimination and gender politics to get to the truth about differences between the brains of men and women.

<https://www.newscientist.com/article/mg26134791-300-new-evidence-finally-reveals-how-male-and-female-brains-really-differ/>

ALISON GEORGE – The strange truth about why thinking hard makes you feel exhausted

Your brain burns through the same amount of energy whether you're daydreaming or taking an exam. So why do we experience mental fatigue?

<https://www.newscientist.com/article/mg26134791-200-the-strange-truth-about-why-thinking-hard-makes-you-feel-exhausted/>

CHEN LY – Great apes like teasing each other - which may be the origin of humour

Chimpanzees, bonobos, orangutans and gorillas frequently toy with their peers by poking, tickling or stealing from them, perhaps showing behaviours that were prerequisites for human joking.

<https://www.newscientist.com/article/2417005-great-apes-like-teasing-each-other-which-may-be-the-origin-of-humour/>

PeerJ

COMMENTARIES

MAXIME CAUTÉ, EMMANUEL CHEMLA & PHILIPPE SCHLENKER – Inconsistent effects of components as evidence for non-compositionality in chimpanzee face-gesture combinations? A response to Oña et al (2019)

Using field observations from a sanctuary, Oña and colleagues (DOI: 10.7717/peerj.7623) investigated the semantics of face-gesture combinations in chimpanzees (*Pan troglodytes*). The response of the animals to these signals was encoded as a binary measure: positive interactions such as approaching or grooming were considered affiliative; ignoring or attacking was considered non-affiliative. The relevant signals are illustrated in Fig. 1 (<https://doi.org/10.7717/peerj.7623/fig-1>), together with the outcome in terms of average affiliativeness. The authors observe that there seems to be no systematicity in the way the faces modify the responses to the gestures, sometimes reducing affiliativeness, sometimes increasing it. A strong interpretation of this result would be that the meaning of a gesture-face combination cannot be derived from the meaning of the gesture and the meaning of the face, that is, the interpretation of chimpanzees' face-gesture combinations are non-compositional in nature. We will revisit this conclusion: we will exhibit simple compositional systems which, after all, may be plausible. At the methodological level, we argue that it is critical to lay out the theoretical options explicitly for a complete comparison of their pros and cons.

<https://peerj.com/articles/16800/>

[Original paper <https://peerj.com/articles/7623/> In EAORC Bulletin 849.]

PLoS One

PAPERS

ANNA N. OSIECKA et al – Calls of the little auk (*Alle alle*) chicks reflect their behavioural contexts

Animal vocalisations can often inform conspecifics about the behavioural context of production and the underlying affective states, hence revealing whether a situation should be approached or avoided. While this is particularly important for socially complex species, little is known about affective expression in wild colonial animals, and even less to about their young. We studied vocalisations of the little auk (*Alle alle*) chicks in the Hornsund breeding colony, Svalbard. Little auks are highly colonial seabirds, and adults convey complex behavioural contexts through their calls. We recorded chick calls during two contexts of opposite affective valence: handling by a human, and while they interact with their parents inside the nest. Using permuted discriminant function analysis and a series of linear mixed models, we examined the effect of the production context/associated affective valence on the acoustic parameters of those calls. Calls were reliably classified to their context, with over 97% accuracy. Calls uttered during handling had higher mean entropy, fundamental frequency, as well as lower spectral centre of gravity and a less steep spectral slope compared to calls produced during interactions with a parent inside the nest. The individuality of handling calls, assessed by information content, was lower than the individuality of calls uttered in the nest. These findings suggest that seabird chicks can effectively communicate behavioural/affective contexts through calls, conveying socially important messages early in development. Our results are mostly in line with emotional expression patterns observed across taxa, supporting their evolutionary continuity.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0299033>

Proceedings of the Royal Society B

PAPERS

DAVID L. BARACK et al – Attention deficits linked with proclivity to explore while foraging

All mobile organisms forage for resources, choosing how and when to search for new opportunities by comparing current returns with the average for the environment. In humans, nomadic lifestyles favouring exploration have been associated with genetic mutations implicated in attention deficit hyperactivity disorder (ADHD), inviting the hypothesis that this condition may impact foraging decisions in the general population. Here we tested this pre-registered hypothesis by examining how human participants collected resources in an online foraging task. On every trial, participants chose either to continue to collect rewards from a depleting patch of resources or to replenish the patch. Participants also completed a well-validated ADHD self-report screening assessment at the end of sessions. Participants departed resource patches sooner when travel times between patches were shorter than when they were longer, as predicted by optimal foraging theory. Participants whose scores on the ADHD scale crossed the threshold for a positive screen departed patches significantly sooner than participants who did not meet this criterion. Participants meeting this threshold for ADHD also achieved higher reward rates than individuals who did not. Our findings suggest that ADHD attributes may confer foraging advantages in some environments and invite the possibility that this condition may reflect an adaptation favouring exploration over exploitation.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2022.2584>

Quarterly Review of Biology

REVIEWS

TOBIAS ULLER – Domains and Major Transitions of Social Evolution

Review of 'Domains and Major Transitions of Social Evolution' by Jacobus J. Boomsma. Oxford University Press, 2023.

<https://www.journals.uchicago.edu/doi/abs/10.1086/729243>

MARTIN BREMER – The Evolution of Agency

Review of 'The Evolution of Agency: Behavioral Organization from Lizards to Humans' by Michael Tomasello. MIT Press, 2022.

<https://www.journals.uchicago.edu/doi/abs/10.1086/729256>

ALEXANDER N.G. KIRSCHER – The Voices of Nature

Review of 'The Voices of Nature: How and Why Animals Communicate' by Nicolas Mathevon; Foreword by Bernie Krause; illustrated by Bernard Mathevon. Princeton University Press, 2023 [originally published in French in 2021, an accompanying website is available.]

<https://www.journals.uchicago.edu/doi/abs/10.1086/729263>

Royal Society Open Science

PAPERS

RICARDA BOTHE et al – Words and arbitrary actions in early object categorization: weak evidence for a word advantage

Both words and gestures have been shown to influence object categorization, often even overriding perceptual similarities to cue category membership. However, gestures are often meaningful to infants while words are arbitrarily related to an object

they refer to, more similar to arbitrary actions that can be performed on objects. In this study, we examine how words and arbitrary actions shape category formation. Across three conditions (word cue, action cue, word–action cue), we presented infants (N = 90) with eight videos of single-category objects which vary in colour and other perceptual features. The objects were either accompanied by a word and/or an action that is being performed on the object. Infants in the word and action condition showed a decrease in looking over the course of the familiarization phase indicating habituation to the category, but infants in the word–action condition did not. At test, infants saw a novel object of the just-learned category and a novel object from another category side-by-side on the screen. There was some evidence for an advantage for words in shaping early object categorization, although we note that this was not robust across analyses.

<https://royalsocietypublishing.org/doi/10.1098/rsos.230648>

Science

PAPERS

PASCAL O. TITLE et al – The macroevolutionary singularity of snakes

Snakes and lizards (Squamata) represent a third of terrestrial vertebrates and exhibit spectacular innovations in locomotion, feeding, and sensory processing. However, the evolutionary drivers of this radiation remain poorly known. We infer potential causes and ultimate consequences of squamate macroevolution by combining individual-based natural history observations (>60,000 animals) with a comprehensive time-calibrated phylogeny that we anchored with genomic data (5400 loci) from 1018 species. Due to shifts in the dynamics of speciation and phenotypic evolution, snakes have transformed the trophic structure of animal communities through the recurrent origin and diversification of specialized predatory strategies. Squamate biodiversity reflects a legacy of singular events that occurred during the early history of snakes and reveals the impact of historical contingency on vertebrate biodiversity.

<https://www.science.org/doi/10.1126/science.adh2449>

Science Advances

PAPERS

PATRICK SCHMIDT et al – Ochre-based compound adhesives at the Mousterian type-site document complex cognition and high investment

Ancient adhesives used in multicomponent tools may be among our best material evidences of cultural evolution and cognitive processes in early humans. African *Homo sapiens* is known to have made compound adhesives from naturally sticky substances and ochre, a technical behavior proposed to mark the advent of elaborate cognitive processes in our species. Foragers of the European Middle Paleolithic also used glues, but evidence of ochre-based compound adhesives is unknown. Here, we present evidence of this kind. Bitumen was mixed with high loads of goethite ochre to make compound adhesives at the type-site of the Mousterian, Le Moustier (France). Ochre loads were so high that they lowered the adhesive's performance in classical hafting situations where stone implements are glued to handles. However, when used as handheld grips on cutting or scraping tools, a behavior known from Neanderthals, high-ochre adhesives present a real benefit, improving their solidity and rigidity. Our findings help understand the implications of Pleistocene adhesive making.

<https://www.science.org/doi/10.1126/sciadv.adl0822>

Trends in Cognitive Sciences

PAPERS

RUOBING XIA et al – Common and distinct neural mechanisms of attention

Despite a constant deluge of sensory stimulation, only a fraction of it is used to guide behavior. This selective processing is generally referred to as attention, and much research has focused on the neural mechanisms controlling it. Recently, research has broadened to include more ways by which different species selectively process sensory information, whether due to the sensory input itself or to different behavioral and brain states. This work has produced a complex and disjointed body of evidence across different species and forms of attention. However, it has also provided opportunities to better understand the breadth of attentional mechanisms. Here, we summarize the evidence that suggests that different forms of selective processing are supported by mechanisms both common and distinct.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(24\)00005-6](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00005-6)

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