EAORC BULLETIN 989 – 29 May 2022

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.

ACADEMIA.EDU – Biface Knapping Skill in the East African Acheulean

In African Archaeological Review 35, 107-131 (2018).

C. SHIPTON – Biface Knapping Skill in the East African Acheulean: Progressive Trends and Random Walks

Over the 1.5-million-year duration of the Acheulean, there is considerable variation in biface finesse. It is not clear, however, if there is an improvement in biface knapping ability over time, or if variation between sites is largely unrelated to their age. The diversity and duration of the East African Acheulean presents an opportunity to examine this issue. Variables that reflect difficult aspects of biface knapping, and which were likely important goals for Acheulean hominins, were measured in order to assess skill. These variables — refinement (thinness), edge straightness, and symmetry — were compared across four East African Acheulean sites: Olduvai Gorge, Olorgesailie, Kariandusi, and Isinya. The influence of rock type, blank type, reduction intensity, aberrant scar terminations, and invasive flaking on these variables was assessed. Over relatively short timescales, confounding factors, including ones not possible to control for, tend to obscure any temporal signature in biface knapping skill. However, over the vast timespan of the Acheulean at Olduvai Gorge, a temporal trend was indeed apparent. Possible

factors influencing this trend include the invention of new knapping techniques, the addition of adolescence as a life history stage, and evolving hominin cognition.
https://link.springer.com/article/10.1007/s10437-018-9287-1

ACADEMIA.EDU – New Framework for Describing Global-Scale Variation in Stone Tool Technology

In Journal of Archaeological Method and Theory 20, 151-186 (2013).

JOHN J. SHEA – Lithic Modes A–I: A New Framework for Describing Global-Scale Variation in Stone Tool Technology Illustrated with Evidence from the East Mediterranean Levant

Grahame Clark's framework for describing stone tool assemblages in terms of five technological "modes" enjoys wide use in European, African, and Asian prehistory. With greater usage and increases in the global archaeological database for prehistory, problems and weaknesses of Clark's framework have become apparent. This paper reviews these problems and proposes an updated framework, modes A – I, for describing variability in stone tool production strategies. The value of this new framework for prehistory is illustrated using data from the East Mediterranean Levant.

https://www.academia.edu/2619432/John_J_Shea_2013_Lithic_Modes_A_I_A_New_Framework_for_Describing_Global_Scale_Variation_in_Stone_Tool_Technology_Illustrated_with_Evidence_from_the_East_Mediterranean_Levant_Journal_of_Archaeological_Method_and_Theory_20_1_151_186

NEWS

SCIENCE DAILY – Noisy jackdaw birds reach 'consensus' before taking off

On cold, dark winter mornings, small black crows known as jackdaws can be heard calling loudly to one another from their winter roosting spots in the U.K. before taking off simultaneously right around sunrise. Now, researchers who've studied their daily activities in unprecedented detail report evidence that these groups of hundreds of individuals rely on a 'democratic' decision-making process to coordinate with one another and take to the skies all at once.
https://www.sciencedaily.com/releases/2022/05/220523115520.htm

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SCIENCE DAILY – When male buddies become less important than female mating partners

Close friendships among males are rare in the animal kingdom, as males usually compete for rank and access to females. However, male friendships can also be beneficial for male reproduction, as friends can provide support in climbing the rank ladder or defending females from other males. Scientists have now investigated the benefits of male friendships in wild Guinea baboons in Senegal.
https://www.sciencedaily.com/releases/2022/05/220525102929.htm

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SCIENCE DAILY – Just being exposed to new things makes people 'ready to learn'

A new study is one of the first to provide experimental evidence that people learn from incidental exposure to things that they know nothing about and aren't even trying to understand.
https://www.sciencedaily.com/releases/2022/05/220527085221.htm

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SCIENCE NEWS – Why yawns are contagious—in all kinds of animals

The mere sight of another person yawning causes many of us to open our mouths wide in mimicry. And we're not alone—other social animals, such as chimpanzees and lions, can also catch so-called contagious yawns. It's likely that all vertebrates yawn spontaneously to regulate inner body processes.
https://www.science.org/content/article/why-yawns-are-contagious-all-kinds-animals?utm_source=sfmc

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SOCIETY FOR SCIENCE – These dolphins may turn to corals for skin care

For Indo-Pacific bottlenosed dolphins, rubbing against corals and sea sponges that contain antibacterial compounds could help keep skin healthy.
http://click.societyforscience-email.com/?qs=e356ca1f1b5ae09802100384b29c2d22ec13b348cea6b6a7c69298c69686d210198fc346e76ee3990ddf58fd6b1066c9829090e5f97b08a0e1c9ef5c76988429

THE CONVERSATION – What makes us smarter than other animals? New research gives intriguing answer

Human brains seem to be wired differently to those of chimps or macaques.
https://theconversationuk.cmail19.com/t/r-l-tyitijz-khhlilahh-c/

Animal Behaviour

PAPERS

VERONICA MAGLIERI et al – The relaxed open mouth is a true signal in dogs: demonstrating Tinbergen's ritualization process

Play fighting, the most iconic form of social play, is often punctuated by specific signals, such as the relaxed open mouth (ROM) display, limiting the risk of misunderstanding between playmates. Although there is general consensus that the ROM of dogs is a ritualized version of play biting, the empirical demonstration of the actual ritualization of ROM has been lacking. We videorecorded and analysed 118 playful sessions involving 24 Czechoslovakian wolfdogs (12 females; 12 males), which is a breed of domestic dog, Canis lupus familiaris, showing wolf-like behavioural traits. By using an integrated approach of different techniques (dog facial action coding system, an unsupervised cluster analysis and the Levenshtein distance), we empirically demonstrate that the ROM is intrinsically different from the play biting action in this breed of dog. Contrary to the play bite, during ROM, the recruitment of muscular action units for each facial display was more consistent, conspicuous and intra- and interindividually stereotyped. Moreover, a sequential analysis revealed that the ROM usually preceded playful offensive patterns, thus underlining the real metacommunicative function of the signal. Finally, by running a linear mixed model, we found that the most balanced sessions were punctuated by the most prolonged performance of ROM, thus revealing the efficiency of the facial signal in maintaining a balanced session. In conclusion, through the processes of formalization, simplification and emphasis, an ordinary precursor behaviour (i.e. play biting) has been taken out of context and transformed into an extraordinary, derived behaviour (i.e. ROM) specifically designed to attract receivers' attention and modulate playful social interactions in dogs.

https://www.sciencedirect.com/science/article/abs/pii/S0003347222000835

SARAH J. CLEMENTS et al – Modelling associations between animal social structure and demography

Successfully navigating a complex social environment can influence fitness (i.e. survival and reproductive success), which can cascade to outcomes in demography and population dynamics. Extensive research has focused on the mechanisms and drivers of fitness variation that result from differences in social structure and interactions, and separately, the effects of demography on population change. However, there have been few attempts to address the effects of social structure on population dynamics through demography. Here, we first review the effects of social structure and individual social position on fitness. We then address knowledge gaps, including the relationship between social structure and population dynamics, the carryover effects of social conditions, and the differential effects of social variables on specific demographic rates. We also review statistical tools and data requirements for the analysis of social networks and demography. We then propose that knowledge gaps could be filled by using joint modelling approaches. We used a simulation study to highlight the potential use of social networks to inform survival, a key demographic parameter. We developed a model that combines social network and survival (Cormack–Jolly–Seber) analyses and evaluated its performance to place inferences under different group structures and sampling scenarios using simulated data. Our results show that valid inferences on social and survival parameters and their connections can be achieved with realistic sample sizes, but precision is improved with more complete information (i.e. fewer missing individuals). Based on our review and simulation study, we suggest that further development of integrative modelling approaches can yield greater understanding and improved power to make predictions about the effects of social environments on populations and the feedback of population dynamics on social structure.

https://www.sciencedirect.com/science/article/abs/pii/S0003347222000884

Current Biology

ARTICLES

DAMIEN R. FARINE – Collective behaviour: Jackdaws vote to leave with their voice

Making a decision as a group requires not only choosing where to go but also when to go. A new study provides experimental evidence that, in jackdaws, vocalisations facilitate synchronous early morning departures from communal roosts.

https://www.cell.com/current-biology/fulltext/S0960-9822(22)00510-3

PAPERS

KAINING ZHANG et al – Surprise and recency in novelty detection in the primate brain

Primates and other animals must detect novel objects. However, the neuronal mechanisms of novelty detection remain unclear. Prominent theories propose that visual object novelty is either derived from the computation of recency (how long ago a stimulus was experienced) or is a form of sensory surprise (stimulus unpredictability). Here, we use high-channel electrophysiology in primates to show that in many primate prefrontal, temporal, and subcortical brain areas, object novelty detection is intertwined with the computations of recency and sensory surprise. Also, distinct circuits could be engaged by expected versus unexpected sensory surprise. Finally, we studied neuronal novelty-to-familiarity transformations during learning across many days. We found a diversity of timescales in neurons' learning rates and between-session forgetting rates, both within and across brain areas, that are well suited to support flexible behavior and learning in response to novelty. Our findings show that novelty sensitivity arises on multiple timescales across single neurons due to diverse but

related computations of sensory surprise and recency and shed light on the computational underpinnings of novelty detection in the primate brain.
https://www.cell.com/current-biology/fulltext/S0960-9822(22)00504-8

CORY T. MILLER et al – Natural behavior is the language of the brain
The breadth and complexity of natural behaviors inspires awe. Understanding how our perceptions, actions, and internal thoughts arise from evolved circuits in the brain has motivated neuroscientists for generations. Researchers have traditionally approached this question by focusing on stereotyped behaviors, either natural or trained, in a limited number of model species. This approach has allowed for the isolation and systematic study of specific brain operations, which has greatly advanced our understanding of the circuits involved. At the same time, the emphasis on experimental reductionism has left most aspects of the natural behaviors that have shaped the evolution of the brain largely unexplored. However, emerging technologies and analytical tools make it possible to comprehensively link natural behaviors to neural activity across a broad range of ethological contexts and timescales, heralding new modes of neuroscience focused on natural behaviors. Here we describe a three-part roadmap that aims to leverage the wealth of behaviors in their naturally occurring distributions, linking their variance with that of underlying neural processes to understand how the brain is able to successfully navigate the everyday challenges of animals' social and ecological landscapes. To achieve this aim, experimenters must harness one challenge faced by all neurobiological systems, namely variability, in order to gain new insights into the language of the brain.
https://www.cell.com/current-biology/fulltext/S0960-9822(22)00426-2

ALEX J. DIBNAH et al with ALEX THORNTON – Vocally mediated consensus decisions govern mass departures from jackdaw roosts
In the early morning, large groups of up to hundreds or even thousands of roosting birds, sometimes comprising the entire roost population, often take off together in sudden mass departures. These departures commonly occur in low-light conditions and structurally complex habitats where access to visual cues is likely to be restricted. Roosting birds are often highly vocal, leading us to hypothesise that vocalisations, which can propagate over large distances, could provide a means of enabling individuals to agree on when to depart — that is to establish a consensus — and thus coordinate the timing of mass movements. Investigations of the role of acoustic signals in coordinating collective decisions have been limited to honeybees and relatively small vertebrate groups (<50 individuals) and have rarely included experimental validation. Here, by combining field recordings with a large-scale experimental manipulation, we show that jackdaws (Corvus monedula) use vocalisations to coordinate mass departures from winter roosts. This provides empirical evidence for vocally-mediated consensus decision-making in large vertebrate groups.
https://www.cell.com/current-biology/fulltext/S0960-9822(22)00601-7

JONATHAN ROMIGUIER et al – Ant phylogenomics reveals a natural selection hotspot preceding the origin of complex eusociality
The evolution of eusociality has allowed ants to become one of the most conspicuous and ecologically dominant groups of organisms in the world. A large majority of the current ~14,000 ant species belong to the formicoids, a clade of nine subfamilies that exhibit the most extreme forms of reproductive division of labor, large colony size, worker polymorphism, and extended queen longevity. The eight remaining non-formicoid subfamilies are less well studied, with few genomes having been sequenced so far and unclear phylogenetic relationships. By sequencing 65 genomes, we provide a robust phylogeny of the 17 ant subfamilies, retrieving high support to the controversial leptanillomorph clade (Leptanillinae and Martialinae) as the sister group to all other extant ants. Moreover, our genomic analyses revealed that the emergence of the formicoids was accompanied by an elevated number of positive selection events. Importantly, the top three gene functions under selection are linked to key features of complex eusociality, with histone acetylation being implicated in caste differentiation, gene silencing by RNA in worker sterility, and autophagy in longevity. These results show that the key pathways associated with eusociality have been under strong selection during the Cretaceous, suggesting that the molecular foundations of complex eusociality may have evolved rapidly in less than 20 Ma.
https://www.cell.com/current-biology/fulltext/S0960-9822(22)00760-6

eLife
PAPERS

DIANA C. DIMA et al – Social-affective features drive human representations of observed actions
Humans observe actions performed by others in many different visual and social settings. What features do we extract and attend when we view such complex scenes, and how are they processed in the brain? To answer these questions, we curated two large-scale sets of naturalistic videos of everyday actions and estimated their perceived similarity in two behavioral experiments. We normed and quantified a large range of visual, action-related and social-affective features across the stimulus sets. Using a cross-validated variance partitioning analysis, we found that social-affective features predicted similarity judgments better than, and independently of, visual and action features in both behavioral experiments. Next, we conducted an electroencephalography (EEG) experiment, which revealed a sustained correlation between neural responses to videos and their behavioral similarity. Visual, action, and social-affective features predicted neural patterns at early,

intermediate and late stages respectively during this behaviorally relevant time window. Together, these findings show that social-affective features are important for perceiving naturalistic actions, and are extracted at the final stage of a temporal gradient in the brain.
https://elifesciences.org/articles/75027

Frontiers in Ecology and Evolution
PAPERS
R. I. M. DUNBAR – Female Dispersion Is Necessary, but Not Sufficient, for Pairbonded Monogamy in Mammals

Explanations for the evolution of social monogamy in mammals typically emphasise one of two possibilities: females are overdispersed (such that males cannot defend access to more than one female at a time) or males provide a service to the female. However, the first claim has never been formally tested. I test it directly at three levels using population-level data from primates and ungulates. First, I show that the females of monogamous genera do not have territories that are significantly larger, either absolutely or relatively, than those of polygynous genera. Second, using two indices of territorial defendability, I show that, given their typical day journey lengths, males of most monogamous species could easily defend an area large enough to allow them to monopolise as many as 5–10 females if they ranged solitarily. Finally, I use a model of male mate searching strategies to show that the opportunity cost incurred by pairbonded males is typically 5–10 times the reproductive success they actually obtain by being obligately monogamous. This suggests that the selection pressure dissuading them from pursuing a roving male strategy must be very considerable. At present, the evidence is undecided as to whether mitigating predation or infanticide risk is the primary function, but estimates of their impacts suggest that both are in fact plausible.
https://www.frontiersin.org/articles/10.3389/fevo.2022.905298/full

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Interface: Journal of the Royal Society
PAPERS
MICHAEL L. WONG & STUART BARTLETT – Asymptotic burnout and homeostatic awakening: a possible solution to the Fermi paradox?

Previous studies show that city metrics having to do with growth, productivity and overall energy consumption scale superlinearly, attributing this to the social nature of cities. Superlinear scaling results in crises called 'singularities', where population and energy demand tend to infinity in a finite amount of time, which must be avoided by ever more frequent 'resets' or innovations that postpone the system's collapse. Here, we place the emergence of cities and planetary civilizations in the context of major evolutionary transitions. With this perspective, we hypothesize that once a planetary civilization transitions into a state that can be described as one virtually connected global city, it will face an 'asymptotic burnout', an ultimate crisis where the singularity-interval time scale becomes smaller than the time scale of innovation. If a civilization develops the capability to understand its own trajectory, it will have a window of time to affect a fundamental change to prioritize long-term homeostasis and well-being over unyielding growth—a consciously induced trajectory change or 'homeostatic awakening'. We propose a new resolution to the Fermi paradox: civilizations either collapse from burnout or redirect themselves to prioritizing homeostasis, a state where cosmic expansion is no longer a goal, making them difficult to detect remotely.
https://royalsocietypublishing.org/doi/full/10.1098/rsif.2022.0029

NICK OBRADOVICH et al – Expanding the measurement of culture with a sample of two billion humans

Culture has played a pivotal role in human evolution. Yet, the ability of social scientists to study culture is limited by the currently available measurement instruments. Scholars of culture must regularly choose between scalable but sparse survey-based methods or restricted but rich ethnographic methods. Here, we demonstrate that massive online social networks can advance the study of human culture by providing quantitative, scalable and high-resolution measurement of behaviourally revealed cultural values and preferences. We employ data across nearly 60 000 topic dimensions drawn from two billion Facebook users across 225 countries and territories. We first validate that cultural distances calculated from this measurement instrument correspond to traditional survey-based and objective measures of cross-national cultural differences. We then demonstrate that this expanded measure enables rich insight into the cultural landscape globally at previously impossible resolution. We analyse the importance of national borders in shaping culture and compare subnational divisiveness with gender divisiveness across countries. Our measure enables detailed investigation into the geopolitical stability of countries, social cleavages within small- and large-scale human groups, the integration of migrant populations and the disaffection of certain population groups from the political process, among myriad other potential future applications.
https://royalsocietypublishing.org/doi/full/10.1098/rsif.2022.0085

Nature Communications

ELIZABETH MUSZ & JANICE CHEN – Neural signatures associated with temporal compression in the verbal retelling of past events

When we retell our past experiences, we aim to reproduce some version of the original events; this reproduced version is often temporally compressed relative to the original. However, it is currently unclear how this compression manifests in brain activity. One possibility is that a compressed retrieved memory manifests as a neural pattern which is more dissimilar to the original, relative to a more detailed or vivid memory. However, we argue that measuring raw dissimilarity alone is insufficient, as it confuses a variety of interesting and uninteresting changes. To address this problem, we examine brain pattern changes that are consistent across people. We show that temporal compression in individuals' retelling of past events predicts systematic encoding-to-recall transformations in several higher associative regions. These findings elucidate how neural representations are not simply reactivated, but can also be transformed due to temporal compression during a universal form of human memory expression: verbal retelling.
https://www.nature.com/articles/s42003-022-03418-5

Nature Human Behaviour

MHAIRI A. GIBSON – Origins of genital mutilation/cutting

An enduring puzzle in evolution is the maintenance of costly traits. Šaffa et al.1 examine phylogenetic evidence for the origins of genital mutilation/cutting (GM/C) in human societies, and find that these practices probably emerged multiple times during the past 5,000–7,000 years, and that female GM/C arose only after male GM/C was present in a society.
https://www.nature.com/articles/s41562-022-01356-0

NING MEI, ROBERTO SANTANA & DAVID SOTO – Informative neural representations of unseen contents during higher-order processing in human brains and deep artificial networks

A framework to pinpoint the scope of unconscious processing is critical to improve models of visual consciousness. Previous research observed brain signatures of unconscious processing in visual cortex, but these were not reliably identified. Further, whether unconscious contents are represented in high-level stages of the ventral visual stream and linked parieto-frontal areas remains unknown. Using a within-subject, high-precision functional magnetic resonance imaging approach, we show that unconscious contents can be decoded from multi-voxel patterns that are highly distributed alongside the ventral visual pathway and also involving parieto-frontal substrates. Classifiers trained with multi-voxel patterns of conscious items generalized to predict the unconscious counterparts, indicating that their neural representations overlap. These findings suggest revisions to models of consciousness such as the neuronal global workspace. We then provide a computational simulation of visual processing/representation without perceptual sensitivity by using deep neural networks performing a similar visual task. The work provides a framework for pinpointing the representation of unconscious knowledge across different task domains.
https://www.nature.com/articles/s41562-021-01274-7

GABRIEL ŠAFFA, JAN ZRZAVÝ & PAVEL DUDA – Global phylogenetic analysis reveals multiple origins and correlates of genital mutilation/cutting

Genital mutilation/cutting is costly in terms of health, survival and reproduction, and the long-term maintenance of these practices is an evolutionary conundrum. Previous studies have suggested a mate-guarding function or various signalling functions of genital mutilation/cutting. Here we use phylogenetic comparative methods and two global ethnographic samples to study the origins and socio-ecological correlates of major types of female and male genital mutilation/cutting. Male genital mutilation/cutting probably originated in polygynous societies with separate residence of co-wives, supporting a mate-guarding function. Female genital mutilation/cutting originated subsequently and almost exclusively in societies already practising male genital mutilation/cutting, where it may have become a signal of chastity. Both have originated multiple times, some as early as in the mid-Holocene (5,000–7,000 years ago), considerably predating the earliest archaeological evidence and written records. Genital mutilation/cutting co-evolves with and may help maintain fundamental social structures, hindering efforts to change these cultural practices.
https://www.nature.com/articles/s41562-022-01321-x

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

Human languages are based on syntax, a set of rules which allow an infinite number of meaningful sentences to be constructed from a finite set of words. A theory associated with Chomsky and others holds that syntax is a mind-internal, universal structure independent of semantics. This theory, however, has been challenged by studies of the Chinese language showing that syntax is processed under the semantic umbrella, and is secondary and not independent. Here, using intracranial high-density electrocorticography, we find distinct spatiotemporal patterns of neural activity in the left inferior

frontal gyrus that are specifically associated with syntactic and semantic processing of Chinese sentences. These results suggest that syntactic processing may occur before semantic processing. Our findings are consistent with the view that the human brain implements syntactic structures in a manner that is independent of semantics.
https://www.nature.com/articles/s41562-022-01334-6

Nature Neuroscience
PAPERS
ANDREA I. LUPPI et al – A synergistic core for human brain evolution and cognition
functional interactions between brain regions into synergistic and redundant components, revealing their distinct information-processing roles. Combining functional and structural neuroimaging with meta-analytic results, we demonstrate that redundant interactions are predominantly associated with structurally coupled, modular sensorimotor processing. Synergistic interactions instead support integrative processes and complex cognition across higher-order brain networks. The human brain leverages synergistic information to a greater extent than nonhuman primates, with high-synergy association cortices exhibiting the highest degree of evolutionary cortical expansion. Synaptic density mapping from positron emission tomography and convergent molecular and metabolic evidence demonstrate that synergistic interactions are supported by receptor diversity and human-accelerated genes underpinning synaptic function. This information-resolved approach provides analytic tools to disentangle information integration from coupling, enabling richer, more accurate interpretations of functional connectivity, and illuminating how the human neurocognitive architecture navigates the trade-off between robustness and integration.
https://www.nature.com/articles/s41593-022-01070-0

Nature Scientific Reports
PAPERS
RAKSHITH LOKESH et al – Humans utilize sensory evidence of others' intended action to make online decisions
We often acquire sensory information from another person's actions to make decisions on how to move, such as when walking through a crowded hallway. Past interactive decision-making research has focused on cognitive tasks that did not allow for sensory information exchange between humans prior to a decision. Here, we test the idea that humans accumulate sensory evidence of another person's intended action to decide their own movement. In a competitive sensorimotor task, we show that humans exploit time to accumulate sensory evidence of another's intended action and utilize this information to decide how to move. We captured this continuous interactive decision-making behaviour with a drift-diffusion model. Surprisingly, aligned with a 'paralysis-by-analysis' phenomenon, we found that humans often waited too long to accumulate sensory evidence and failed to make a decision. Understanding how humans engage in interactive and online decision-making has broad implications that spans sociology, athletics, interactive technology, and economics.
https://www.nature.com/articles/s41598-022-12662-y

INGA BERGMANN et al with JEAN-JACQUES HUBLIN – The relevance of late MSA mandibles on the emergence of modern morphology in Northern Africa
North Africa is a key area for understanding hominin population movements and the expansion of our species. It is home to the earliest currently known Homo sapiens (Jebel Irhoud) and several late Middle Stone Age (MSA) fossils, notably Kébibat, Contrebandiers 1, Dar-es-Soltane II H5 and El Harhoura. Mostly referred to as "Aterian" they fill a gap in the North African fossil record between Jebel Irhoud and Iberomaurusians. We explore morphological continuity in this region by quantifying mandibular shape using 3D (semi)landmark geometric morphometric methods in a comparative framework of late Early and Middle Pleistocene hominins (n = 15), Neanderthals (n = 27) and H. sapiens (n = 145). We discovered a set of mixed features among late MSA fossils that is in line with an accretion of modern traits through time and an ongoing masticatory gracilization process. In Northern Africa, Aterians display similarities to Iberomaurusians and recent humans in the area as well as to the Tighenif and Thomas Quarry hominins, suggesting a greater time depth for regional continuity than previously assumed. The evidence we lay out for a long-term succession of hominins and humans emphasizes North Africa's role as source area of the earliest H. sapiens.
https://www.nature.com/articles/s41598-022-12607-5

New Scientist
NEWS
Bottlenose dolphins can identify friends by tasting their urine
We already knew that bottlenose dolphins recognise each other through their signature whistles, but now it seems the taste of their urine also plays a role.
https://www.newscientist.com/article/2321285-bottlenose-dolphins-can-identify-friends-by-tasting-their-urine/#ixzz7UQVjHAt1

PeerJ

ERIN MACINTYRE et al – Does who I am and what I feel determine what I see (or say)? A meta-analytic systematic review exploring the influence of real and perceived bodily state on spatial perception of the external environment

Bodily state is theorised to play a role in perceptual scaling of the environment, whereby low bodily capacity shifts visuospatial perception, with distances appearing farther and hills steeper, and the opposite seen for high bodily capacity. This may play a protective role, where perceptual scaling discourages engaging with the environment when capacity is low. We performed a systematic review and meta-analysis examining the role of bodily state/capacity on spatial perception measures of the environment. A total of 8,034 studies were identified from the systematic search. Of these, 68 experiments (3,195 participants) met eligibility and were included in the review. These were grouped into the following categories: fatigue; pain; age; embodiment; body size/body part size; glucose levels; fitness; and interoception, and interoceptive accuracy. We found low level evidence (limited studies, high risk of bias) for the effect of bodily state on spatial perception. There was consistent evidence that both glucose manipulations and age influence spatial perception of distances and hills in a hypothesised direction (lower capacity associated with increased distance and hill steepness). Mixed evidence exists for the influence of external loads, embodiment, body/body-part size manipulations, pain, and interoceptive accuracy. Evidence for fitness and/or fatigue influencing spatial perception was conflicting; notably, methodological flaws with fitness and fatigue paradigms and heterogenous spatial perception measures may underlie null/conflicting results.
https://peerj.com/articles/13383/

PLoS Biology

SHAOHAN JIANG, SIDONG WANG & XIAOHONG WAN – Metacognition and mentalizing are associated with distinct neural representations of decision uncertainty

Metacognition and mentalizing are both associated with meta-level mental state representations. Conventionally, metacognition refers to monitoring one's own cognitive processes, while mentalizing refers to monitoring others' cognitive processes. However, this self-other dichotomy is insufficient to delineate the 2 high-level mental processes. We here used functional magnetic resonance imaging (fMRI) to systematically investigate the neural representations of different levels of decision uncertainty in monitoring different targets (the current self, the past self [PS], and others) performing a perceptual decision-making task. Our results reveal diverse formats of internal mental state representations of decision uncertainty in mentalizing, separate from the associations with external cue information. External cue information was commonly represented in the right inferior parietal lobe (IPL) across the mentalizing tasks. However, the internal mental states of decision uncertainty attributed to others were uniquely represented in the dorsomedial prefrontal cortex (dmPFC), rather than the temporoparietal junction (TPJ) that also represented the object-level mental states of decision inaccuracy attributed to others. Further, the object-level and meta-level mental states of decision uncertainty, when attributed to the PS, were represented in the precuneus and the lateral frontopolar cortex (lFPC), respectively. In contrast, the dorsal anterior cingulate cortex (dACC) represented currently experienced decision uncertainty in metacognition, and also uncertainty about the estimated decision uncertainty (estimate uncertainty), but not the estimated decision uncertainty per se in mentalizing. Hence, our findings identify neural signatures to clearly delineate metacognition and mentalizing and further imply distinct neural computations on internal mental states of decision uncertainty during metacognition and mentalizing.
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001301

Proceedings of the Royal Society B

SILINA ZAATRI, IDAN M. ADERKA & URI HERTZ – Blend in or stand out: social anxiety levels shape information-sharing strategies

Although living in social groups provides many benefits for group members, such groups also serve as a setting for social competition over rank and influence. Evolutionary accounts suggest that social anxiety plays a role in regulating in-group conflict, as individuals who are concerned about social threat may choose to defer to others to maintain the hierarchical status quo. Here, we examine how social anxiety levels are related to the advice-giving style an individual adopts: a competitive influence-seeking strategy or a defensive blend-in strategy. We begin by demonstrating that similarity to others drives activity in the brain's valuation system, even during a competitive advice-taking task. Then, in three behavioural experiments, we show that social anxiety levels are related to the tendency to give advice resembling the advice given by rival advisers and to refrain from status-seeking behaviour. Social anxiety was also associated with negative social comparisons with rival advisers. Our findings highlight the role of competing social goals in shaping information sharing.
https://royalsocietypublishing.org/doi/full/10.1098/rspb.2022.0476

FEDERICA DAL PESCO et al with JULIA FISCHER – Male–male social bonding, coalitionary support and reproductive success in wild Guinea baboons

Male–male bonds may confer substantial fitness benefits. The adaptive value of these relationships is often attributed to coalitionary support, which aids in rank ascension and female defence, ultimately resulting in greater reproductive success.

We investigated the link between male–male sociality and both coalitionary support and reproductive success in wild Guinea baboons. This species lives in a tolerant multi-level society with reproductive units comprising a male and 1–6 females at the core. Males are philopatric, form differentiated, stable and equitable affiliative relationships (strong bonds) with other males, and lack a clear rank hierarchy. Here, we analysed behavioural and paternity data for 30 males and 50 infants collected over 4 years in the Niokolo-Koba National Park, Senegal. Strongly bonded males supported each other more frequently during conflicts, but strong bonds did not promote reproductive success. Instead, males that spent less time socializing with other males were associated with a higher number of females and sired more offspring. Notably, reproductively active males still maintained bonds with other males, but adjusted their social investment in relation to life-history stage. Long-term data will be needed to test if the adaptive value of male bonding lies in longer male tenure and/or in promoting group cohesion.
https://royalsocietypublishing.org/doi/full/10.1098/rspb.2022.0347

MARLEN FRÖHLICH et al with CAREL P. VAN SCHAIK – Individual variation and plasticity in the infant-directed communication of orang-utan mothers

Between-individual variation in behavioural expression, such as social responsiveness, has been shown to have important eco-evolutionary consequences. However, most comparative research on non-human primate communication has focused on species- or population-level variation, while among- and within-individual variation has been largely ignored or considered as noise. Here, we apply a behavioural reaction norm framework to repeated observations of mother–offspring interactions in wild and zoo-housed orang-utans (Pongo abelii, P. pygmaeus) to tease apart variation on the individual level from population-level and species-level differences. Our results showed that mothers not only differed in the composition of their infant-directed gestural repertoires, but also in communicative tactics, such as gestural redoings (i.e. persistence) and responsiveness to infants' requests. These differences remained after controlling for essential moderators, including species, setting, parity and infant age. Importantly, mothers differed in how they adjusted their behaviour across social contexts, making a strong case for investigating within-individual variation. Our findings highlight that partitioning behavioural variation into its within-individual, between-individual and environmental sources allows us to estimate the extent of plastic responses to the immediate environment in great ape communication.
https://royalsocietypublishing.org/doi/full/10.1098/rspb.2022.0200

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PAPERS

NINGNING LANG, LIN WANG & QUANBO ZHA – Opinion dynamics in social networks under competition: the role of influencing factors in consensus-reaching

The rapid development of information technology and social media has provided easy access to the vast data on individual preferences and social interactions. Despite a series of problems, such as privacy disclosure and data sensitivity, it cannot be denied that this access also provides beneficial opportunities and convenience for campaigns involving opinion control (e.g. marketing campaigns and political election). The profitability of opinion and the finiteness of individual attention have already spawned extensive competition for individual preferences on social networks. It is necessary to investigate opinion dynamics over social networks in a competitive environment. To this end, this paper develops a novel social network DeGroot model based on competition game (DGCG) to characterize opinion evolution in a competitive opinion dynamics. Social interactions based on trust relationships are captured in the DGCG model. From the model, we then obtain equilibrium results in a stable state of opinion evolution. We also analyse what role relevant factors play in the final consensus and competitive outcomes, including the resource ratio of both contestants, initial opinions, self-confidence and network structure. Theoretical analyses and numerical simulations show that these factors can significantly sway the consensus and even reverse competition outcomes.
https://royalsocietypublishing.org/doi/full/10.1098/rsos.211732

MARTIN LANG et al – Advertising cooperative phenotype through costly signals facilitates collective action

Around the world, people engage in practices that involve self-inflicted pain and apparently wasted resources. Researchers theorized that these practices help stabilize within-group cooperation by assorting individuals committed to collective action. While this proposition was previously studied using existing religious practices, we provide a controlled framework for an experimental investigation of various predictions derived from this theory. We recruited 372 university students in the Czech Republic who were randomly assigned into either a high-cost or low-cost condition and then chose to play a public goods game (PGG) either in a group that wastes money to signal commitment to high contributions in the game or to play in the group without such signals. We predicted that cooperators would assort in the high-cost revealed group and that, despite these costs, they would contribute more to the common pool and earn larger individual rewards over five iterations of PGG compared with the concealed group and participants in the low-cost condition. The results showed that the assortment of cooperators was more effective in the high-cost condition and translated into larger contributions of the remaining endowment to the common pool, but participants in the low-cost revealed group earned the most. We conclude that costly signals can serve as an imperfect assorting mechanism, but the size of the costs needs to be carefully balanced with potential benefits to be profitable.
https://royalsocietypublishing.org/doi/full/10.1098/rsos.202202

Science

BRUCE WALSH – How full is the evolutionary fuel tank?

In 1898, Hermon Bumpus gathered 136 house sparrows immobilized by an ice storm, noting that the averages of several morphological traits differed between survivors and nonsurvivors. This was one of the first attempts to measure the phenotypic selection component of Charles Darwin's thesis, that adaptation is driven by heritable traits that affect fitness. Since then, a vast literature on quantifying associations between trait values and fitness has emerged. The quantification of Darwin's second evolution component—that such traits are heritable—required the development of quantitative genetics by Ronald Fisher in 1918. Although the selection and genetics components can be combined to determine the expected change in any trait, of greater interest is the general adaptive potential of a population. On page 1012 of this issue, Bonnet et al. present a meta-analysis of 19 studies showing the abundance of heritable variations in fitness and the potential for adaptation.

https://www.science.org/doi/10.1126/science.abo4624

Science Advances

IRENE GARCÍA-RUIZ, ANDRÉS QUIÑONES & MICHAEL TABORSKY – The evolution of cooperative breeding by direct and indirect fitness effects

The evolution of cooperative breeding has been traditionally attributed to the effect of kin selection. While there is increasing empirical evidence that direct fitness benefits are relevant, the relative importance of alternative selection mechanisms is largely obscure. Here, we model the coevolution of the cornerstones of cooperative breeding, delayed dispersal, and alloparental care, across different ecological scenarios while allowing individuals to adjust philopatry and helping levels. Our results suggest that (i) direct fitness benefits from grouping are the main driver for the evolution of philopatry; (ii) kin selection is mainly responsible for the emergence of alloparental care, but group augmentation can be a sufficient promoter in harsh environments; (iii) the coevolution of philopatry and alloparental care is subject to positive feedback; and (iv) age-dependent dispersal is triggered by both group benefits and relatedness. Model predictions are supported by empirical data and provide good opportunities for comparative analyses and experimental tests of causality.

https://www.science.org/doi/full/10.1126/sciadv.abl7853

Trends in Cognitive Sciences

PAUL W. GLIMCHER – Efficiently irrational: deciphering the riddle of human choice

For the past half-century, cognitive and social scientists have struggled with the irrationalities of human choice behavior; people consistently make choices that are logically inconsistent. Is human choice behavior evolutionarily adaptive or is it an inefficient patchwork of competing mechanisms? In this review, I present an interdisciplinary synthesis arguing for a novel interpretation: choice is efficiently irrational. Connecting findings across disciplines suggests that observed choice behavior reflects a precise optimization of the trade-off between the costs of increasing the precision of the choice mechanism and the declining benefits that come as precision increases. Under these constraints, a rationally imprecise strategy emerges that works toward optimal efficiency rather than toward optimal rationality. This approach rationalizes many of the puzzling inconsistencies of human choice behavior, explaining why these inconsistencies arise as an optimizing solution in biological choosers.

https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00091-2

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