EAORC BULLETIN 1,028 – 26 February 2023

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 – Skill and Core Uniformity: An Experiment with Oldowan-like Flaking Systems

In Lithic Technology, DOI: 10.1080/01977261.2023.2178767 (2023).

EVAN PATRICK WILSON et al with DIETRICH STOUT – Skill and Core Uniformity: An Experiment with Oldowan-like Flaking Systems

The Oldowan is the archaeological record's oldest consistent evidence of hominin technical behavior. First appearing ~2.6 Ma in East Africa, the Oldowan is characterized by simple core and flake technology using direct hard hammer percussion. Archaeologists debate whether Oldowan assemblages are uniform and what role hominin cultural abilities played in generating these assemblages. To improve existing methods for studying Oldowan technical uniformity, we conducted

experiments involving 23 novices and one expert knapper. Subjects made simple stone tools under two different instructional conditions (observation-only and direct active instruction) over two hours. We used the resulting cores to track flaking efficiency, reduction intensity, and knapping errors. We find significant differences in the expert and novice core uniformity. Direct active teaching increased core flaking efficiency and reduced knapping errors. Comparisons between our experimental results and an Oldowan sample from Gona, Ethiopia, show core variability patterns that match our expert and actively taught novices.
https://www.academia.edu/97287025/Skill_and_Core_Uniformity_An_Experiment_with_Oldowan_like_Flaking_Systems

RESEARCHGATE – Noam Chomsky: Politics or Science?

In What Next? Marxist discussion journal 26, 17-29 (2003). Updated version, Radical Anthropology Group (2010).

CHRIS KNIGHT – Noam Chomsky: Politics or Science?

Noam Chomsky ranks among the leading intellectual figures of modern times. He has changed the way we think about what it means to be human, gaining a position in the history of ideas – at least according to his supporters – comparable with that of Darwin or Descartes. Since launching his intellectual assault against the academic orthodoxies of the 1950s, he has succeeded – almost single-handedly – in revolutionizing linguistics and establishing it as a modern science. Such victories, however, have come at a cost. The stage was set for the ensuing 'Linguistics Wars' when Chomsky – at that time a young anarchist –published his first book. He might as well have thrown a bomb. 'The extraordinary and traumatic impact of the publication of Syntactic Structures by Noam Chomsky in 1957', recalls one witness, 'can hardly be appreciated by one who did not live through this upheaval.' From that moment, the battles have continued to rage.
https://www.researchgate.net/publication/368659894_Noam_Chomsky_Politics_or_Science

NEWS

NATURE BRIEFING – Surprise appearance of arrows in Europe

The first Homo sapiens to arrive in Europe might have hunted with bows and arrows, around 10,000 years earlier than was thought. In a 54,000-year-old-cave in southern France, alongside a H. sapiens tooth and tools, researchers found hundreds of stone points resembling arrowheads — the smallest of which were so tiny that they would have had enough force to kill an animal only if they were shot with a bow. The technology could have been unique to humans: Neanderthals might have inhabited the area at the same time, but there is no evidence that they also took up archery.
https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=df06996bd4&e=1db4b9a19b

SOCIETY FOR SCIENCE – Homo sapiens may have brought archery to Europe about 54,000 years ago

Small stone points found in a French rock-shelter could have felled prey only as tips of arrows shot from bows, scientists say.
http://click.societyforscience-email.com/?qs=4d000ab72933d4a3f5ac154cb8343505bb230f6fe5ee13adc65d53ac3f8359e85e4d04b8036166bb660d1d59d66fb6993f10f50742ba20ca51243ceb79c18860

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

DIEGO LÓPEZ-ONAINDIA et al – Neanderthal teeth from Lezetxiki (Arrasate, Iberian Peninsula): New insights and reassessment

We reassess the taxonomic assignment and stratigraphic context of a permanent upper first molar and a permanent lower third premolar recovered from the archeological site of Lezetxiki in the North of the Iberian Peninsula.
We assessed the external and internal morphology of the teeth using qualitative descriptions, crown diameters, dental tissue proportions, and geometric morphometrics. The teeth from Lezetxiki were compared with Middle Pleistocene specimens, Neanderthals, Upper Paleolithic modern humans, and recent modern humans.
Both teeth were consistent with a Neanderthal classification. The upper first molar shows taurodontism, and its cusp proportions and overall morphology match those of Neanderthals. Geometric morphometric analyses of occlusal anatomy classify this molar as a Neanderthal with a posterior probability of 76%. The lower third premolar, which was originally classified as a lower fourth premolar, also shows a Neanderthal morphology. This premolar is classified as a Neanderthal with a posterior probability of 60%.
These teeth represent the only adult Neanderthal teeth from the Western Pyrenees region found to date. The teeth were found at a stratigraphic level (designated Level III) that marks the transition level from Mousterian to Aurignacian, and are among the most recent Neanderthal remains from the north of the Iberian Peninsula.
https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24694

CAMPBELL ROLIAN – Re-evaluating the correlated evolution of human hands and feet using viability selection modeling

Bipedalism and enhanced manipulative abilities are defining features of the hominin lineage, associated with derived foot and hand skeletal morphology, respectively. These unique morphologies are traditionally thought to have evolved independently, but previous work suggests that some aspects of hand and foot skeletal morphology coevolved, due to strong phenotypic correlations among serially homologous elements.

Here, I further tested this hypothesis using viability selection modeling, which simulates phenotypic evolution based on the likelihood of individual survival, determined using individuals' distance to a predetermined adaptive peak, in this case modern Homo. Using chimpanzees (Pan) as a proxy for hominin ancestral hand and foot morphology, I quantified morphological changes in the hand when only homologous foot elements were targets of selection, as well as the reverse scenario in which only hand morphology influences viability.

Simulation results show that in both scenarios, one autopod evolves as correlated response to selection acting on the other. Importantly, however, simulation outcomes show that the adaptive evolution of the uniquely derived human foot can indirectly produce Homo-like manual proportions, but the reverse is not true: adaptive evolution of an African ape-like hand is not sufficient to produce a Homo-like human foot.

These simulations thus lend further empirical support to the hypothesis that human hands and feet coevolved, and indicate that selection acting on the foot may have produced derived hand morphology that facilitated the evolution of enhanced manipulative behaviors.

https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24693

Australian Journal of Linguistics

PAPERS

GWENDOLYN HYSLOP – Toward a typology of tonogenesis: Revising the model

The birth of tone, or tonogenesis, has been an area of research for over a century, yet we are still unable to predict how and when a language will acquire tone. This article compiles a typology by researching tonogenesis from 40 different languages across a range of families. Each tonogenetic event within these languages is coded for syntagmatic position, manner and laryngeal setting of the tonogenetic trigger. I further make a distinction between 'strict' tonogenesis, when a language acquires tone for the first time, as something distinct from 'broad' tonogenesis, in which a tonal language develops additional tones. The results of this typology then reveal several novel findings, including the prevalence of onset-conditioned tonogenesis and the importance of sonority in strict tonogenesis. In summary, I show that the Vietnamese model is not applicable in most cases and that tonogenesis is a highly varied phenomenon, warranting further detailed study and a more refined model.

https://www.tandfonline.com/doi/full/10.1080/07268602.2022.2157675

Biolinguistics

PAPERS

DANIEL MILWAY – A Formalization of Agree as a Derivational Operation

Using the framework based on set-theory, I develop a formal definition of Agree as a syntactic operation. I begin by constructing a formal definition of a version of long-distance Agree in which a structurally higher element values a feature on a structurally lower element, and modify that definition to reflect various versions of Agree that have been proposed in the "minimalist" literature. I then discuss the theoretical implications of these formal definitions, arguing that Agree requires a new conception of the lexicon, and unjustifiably violates NTC in all its non-vacuous forms.

https://bioling.psychopen.eu/index.php/bioling/article/view/9877/9877.pdf

Cell Reports

PAPERS

KATHARINA F. BRECHT, STEPHANIE WESTENDORFF & ANDREAS NIEDER – Neural correlates of cognitively controlled vocalizations in a corvid songbird

The neuronal basis of the songbird's song system is well understood. However, little is known about the neuronal correlates of the executive control of songbird vocalizations. Here, we record single-unit activity from the pallial endbrain region "nidopallium caudolaterale" (NCL) of crows that vocalize to the presentation of a visual go-cue but refrain from vocalizing during trials without a go-cue. We find that the preparatory activity of single vocalization-correlated neurons, but also of the entire population of NCL neurons, before vocal onset predicts whether or not the crows will produce an instructed vocalization. Fluctuations in baseline neuronal activity prior to the go-cue influence the premotor activity of such vocalization-correlated neurons and seemingly bias the crows' decision to vocalize. Neuronal response modulation significantly differs between volitional and task-unrelated vocalizations. This suggests that the NCL can take control over the vocal motor network during the production of volitional vocalizations in a corvid songbird.

https://www.cell.com/cell-reports/fulltext/S2211-1247(23)00124-9

eLife

PAPERS

SEBASTIAN MOELLER et al with JULIA FISCHER – Human and macaque pairs employ different coordination strategies in a transparent decision game

Many real-world decisions in social contexts are made while observing a partner's actions. To study dynamic interactions during such decisions, we developed a setup where two agents seated face-to-face to engage in game-theoretical tasks on a shared transparent touchscreen display ('transparent games'). We compared human and macaque pairs in a transparent version of the coordination game 'Bach-or-Stravinsky', which entails a conflict about which of two individually-preferred opposing options to choose to achieve coordination. Most human pairs developed coordinated behavior and adopted dynamic turn-taking to equalize the payoffs. All macaque pairs converged on simpler, static coordination. Remarkably, two animals learned to coordinate dynamically after training with a human confederate. This pair selected the faster agent's preferred option, exhibiting turn-taking behavior that was captured by modeling the visibility of the partner's action before one's own movement. Such competitive turn-taking was unlike the prosocial turn-taking in humans, who equally often initiated switches to and from their preferred option. Thus, the dynamic coordination is not restricted to humans but can occur on the background of different social attitudes and cognitive capacities in rhesus monkeys. Overall, our results illustrate how action visibility promotes the emergence and maintenance of coordination when agents can observe and time their mutual actions.

https://elifesciences.org/articles/81641

Frontiers for Young Minds

PAPERS

KATHERINE DIANE ANDRADE & STÉPHANIE KATHLEEN RIÈS – How Do We Catch Our Tongue From Slipping?

Speaking is such an important part of our lives. We use it to communicate with our families, friends, and even our pets! Not only do we talk a lot, but we are also very good at it. Healthy speakers can say 2–3 words per second and usually produce an error only about once every 1,000 words. To limit the number of errors we make, we are continuously monitoring our own speech. While speaking is easy, the brain process of monitoring our own speech is quite complex. In this article, we outline the process of selecting a word, understanding what happens when a speech error is made, and what could happen if the parts of the brain responsible for monitoring speech are damaged.

https://kids.frontiersin.org/articles/10.3389/frym.2023.798279

Frontiers in Psychology

PAPERS

YUTAO ZHANG et al – Analogies of human speech and bird song: From vocal learning behavior to its neural basis

Vocal learning is a complex acquired social behavior that has been found only in very few animals. The process of animal vocal learning requires the participation of sensorimotor function. By accepting external auditory input and cooperating with repeated vocal imitation practice, a stable pattern of vocal information output is eventually formed. In parallel evolutionary branches, humans and songbirds share striking similarities in vocal learning behavior. For example, their vocal learning processes involve auditory feedback, complex syntactic structures, and sensitive periods. At the same time, they have evolved the hierarchical structure of special forebrain regions related to vocal motor control and vocal learning, which are organized and closely associated to the auditory cortex. By comparing the location, function, genome, and transcriptome of vocal learning-related brain regions, it was confirmed that songbird singing and human language-related neural control pathways have certain analogy. These common characteristics make songbirds an ideal animal model for studying the neural mechanisms of vocal learning behavior. The neural process of human language learning may be explained through similar neural mechanisms, and it can provide important insights for the treatment of language disorders.

https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1100969/full

Heliyon

PAPERS

VALENTINA MAMELI et al – Intra-source provenance study on Monte Arci (Sardinia) obsidian by pXRF: Role of the data acquisition and analysis tools

In this work, a detailed study of Monte Arci obsidian sub-sources using the increasingly accessible technique of pXRF is presented based upon a large dataset of 68 geological samples, for the development of X-ray fluorescence-based analytical standardless procedure. In addition, a non-conventional (for obsidian provenance study) direct application of multivariate analysis on XRF spectra (continuous variables), rather than absolute concentrations or intensity ratios (discrete variables) is proposed.

Results from different softwares and data analysis approaches (bi-/trivariate versus multivariate) were compared. In a blind test, the bi-/trivariate approach led to the correct assignment for the main SA, SB, and SC subsources, taking into account averaged values of intensity ratios with their standard deviation obtained from three independent measurements. A high

intra-source variability for the SB subgroups was detected (almost 13% of error in the assignment, 9 samples out of 68). A non-conventional application of multivariate analysis was carried out directly on the XRF spectra and correct assignments were obtained for SA, SB1, SC groups, while 71% of the SB2 samples were correctly identified. The non-destructive analysis on 14 archaeological samples from Su Carroppu (Carbonia, southwestern Sardinia) rockshelter and from the Middle Neolithic (MN) 422 structure of the open-air dwelling site at Cuccuru is Arrius (Cabras, central-western Sardinia) permitted to test the method and hypothesise their provenance. The comparison with visual characterization or previous analyses by Particle Induced X-Ray Emission (PIXE) permitted to verify the correct provenance assignment of all artifacts for the bi-/trivariate method, and for 12/14 samples in the case of the multivariate one. The standardless analytical approach proposed in this work can represent a more general method exploitable for other obsidian sources, other glassy materials, besides other materials of archaeological interest.
https://www.cell.com/heliyon/fulltext/S2405-8440(23)01165-9

Interface: Journal of the Royal Society

PAPERS

SARAH L. WALSH et al with SIMON W. TOWNSEND – Multi-level combinatoriality in magpie non-song vocalizations
Comparative studies conducted over the past few decades have provided important insights into the capacity for animals to combine vocal segments at either one of two levels: within- or between-calls. There remains, however, a distinct gap in knowledge as to whether animal combinatoriality can extend beyond one level. Investigating this requires a comprehensive analysis of the combinatorial features characterizing a species' vocal system. Here, we used a nonlinear dimensionality reduction analysis and sequential transition analysis to quantitatively describe the non-song combinatorial repertoire of the Western Australian magpie (Gymnorhina tibicen dorsalis). We found that (i) magpies recombine four distinct acoustic segments to create a larger number of calls, and (ii) the resultant calls are further combined into larger call combinations. Our work demonstrates two levels in the combining of magpie vocal units. These results are incongruous with the notion that a capacity for multi-level combinatoriality is unique to human language, wherein the combining of meaningless sounds and meaningful words interactively occurs across different combinatorial levels. Our study thus provides novel insights into the combinatorial capacities of a non-human species, adding to the growing evidence of analogues of language-specific traits present in the animal kingdom.
https://royalsocietypublishing.org/doi/full/10.1098/rsif.2022.0679

SHENGXIAN WANG et al – Optimization of institutional incentives for cooperation in structured populations
The application of incentives, such as reward and punishment, is a frequently applied way for promoting cooperation among interacting individuals in structured populations. However, how to properly use the incentives is still a challenging problem for incentive-providing institutions. In particular, since the implementation of incentive is costly, to explore the optimal incentive protocol, which ensures the desired collective goal at a minimal cost, is worthy of study. In this work, we consider the positive and negative incentives for a structured population of individuals whose conflicting interactions are characterized by a Prisoner's Dilemma game. We establish an index function for quantifying the cumulative cost during the process of incentive implementation, and theoretically derive the optimal positive and negative incentive protocols for cooperation on regular networks. We find that both types of optimal incentive protocols are identical and time-invariant. Moreover, we compare the optimal rewarding and punishing schemes concerning implementation cost and provide a rigorous basis for the usage of incentives in the game-theoretical framework. We further perform computer simulations to support our theoretical results and explore their robustness for different types of population structures, including regular, random, small-world and scale-free networks.
https://royalsocietypublishing.org/doi/full/10.1098/rsif.2022.0653

Nature

NEWS

Europe's first humans hunted with bows and arrows
A cave site in France holds hundreds of tiny stone points, alongside remains thought to belong to Homo sapiens.
https://www.nature.com/articles/d41586-023-00526-y

'Mirror neurons' fire up during mouse battles
Brain cells are crucial for triggering fights — but also become active when mice merely observe fights.
https://www.nature.com/articles/d41586-023-00418-1

ARTICLES

EMILY COOKE & ANIL SETH – How I wrote a popular science book about consciousness — and why
Neuroscientist Anil Seth draws on his 20-year career to reveal that the mystery of consciousness need not be beyond science.
https://www.nature.com/articles/d41586-023-00541-z

ANIL SETH – Marvelling at the mystery of consciousness through a scientific lens
Neuroscientist Anil Seth, author of Being You: A New Science of Consciousness, describes the multidisciplinary appeal of his research.
https://www.nature.com/articles/d41586-023-00545-9

Nature Communications

PAPERS

CHRISTOPHER DOUGLAS ROBERT WYATT et al – Social complexity, life-history and lineage influence the molecular basis of castes in vespid wasps
A key mechanistic hypothesis for the evolution of division of labour in social insects is that a shared set of genes co-opted from a common solitary ancestral ground plan (a genetic toolkit for sociality) regulates caste differentiation across levels of social complexity. Using brain transcriptome data from nine species of vespid wasps, we test for overlap in differentially expressed caste genes and use machine learning models to predict castes using different gene sets. We find evidence of a shared genetic toolkit across species representing different levels of social complexity. We also find evidence of additional fine-scale differences in predictive gene sets, functional enrichment and rates of gene evolution that are related to level of social complexity, lineage and of colony founding. These results suggest that the concept of a shared genetic toolkit for sociality may be too simplistic to fully describe the process of the major transition to sociality.
https://www.nature.com/articles/s41467-023-36456-6

Nature Scientific Data

PAPERS

SHAONAN WANG et al – A large dataset of semantic ratings and its computational extension
Evidence from psychology and cognitive neuroscience indicates that the human brain's semantic system contains several specific subsystems, each representing a particular dimension of semantic information. Word ratings on these different semantic dimensions can help investigate the behavioral and neural impacts of semantic dimensions on language processes and build computational representations of language meaning according to the semantic space of the human cognitive system. Existing semantic rating databases provide ratings for hundreds to thousands of words, which can hardly support a comprehensive semantic analysis of natural texts or speech. This article reports a large database, the Six Semantic Dimension Database (SSDD), which contains subjective ratings for 17,940 commonly used Chinese words on six major semantic dimensions: vision, motor, socialness, emotion, time, and space. Furthermore, using computational models to learn the mapping relations between subjective ratings and word embeddings, we include the estimated semantic ratings for 1,427,992 Chinese and 1,515,633 English words in the SSDD. The SSDD will aid studies on natural language processing, text analysis, and semantic representation in the brain.
https://www.nature.com/articles/s41597-023-01995-6

Nature Scientific Reports

PAPERS

OLAF BORGHI et al – Differential associations of the two higher-order factors of mindfulness with trait empathy and the mediating role of emotional awareness
Empathy enables us to understand the emotions of others and is an important determinant of prosocial behavior. Investigating the relationship between mindfulness and empathy could therefore provide important insights into factors that promote interpersonal understanding and pathways that contribute to prosocial behavior. As prior studies have yielded only inconsistent results, this study extended previous findings and investigated for the first time the associations of two important factors of mindfulness (Self-regulated Attention [SRA] and Orientation to Experience [OTE]) with two commonly proposed components of empathy (cognitive empathy and affective empathy). Using a community sample of N = 552 German-speaking adults, the two mindfulness factors were differentially associated with cognitive and affective empathy. SRA correlated positively with cognitive empathy (r = 0.44; OTE: r = 0.09), but OTE correlated negatively with affective empathy (r = − 0.27; SRA: r = 0.11). This negative association was strongest for one specific aspect of affective empathy, emotional contagion. Revisiting previously reported mediating effects of emotion regulation, we found that emotional awareness mediated the associations with both components of empathy, but only for SRA. Together, these findings imply that mindfulness benefits the cognitive understanding of others' emotions via two distinct pathways: by promoting emotional awareness (SRA) and by limiting the undue impact of others' emotions on oneself (OTE).
https://www.nature.com/articles/s41598-023-30323-6

ANNA ZAMM, STEFAN DEBENER & NATALIE SEBANZ – The spontaneous emergence of rhythmic coordination in turn taking
Turn-taking is a feature of many social interactions such as group music-making, where partners must alternate turns with high precision and accuracy. In two studies of musical rhythm coordination, we investigated how joint action partners learn to coordinate the timing of turn-taking. Musically inexperienced individuals learned to tap at the rate of a pacing cue

individually or jointly (in turn with a partner), where each tap produced the next tone in a melodic sequence. In Study 1, partners alternated turns every tap, whereas in Study 2 partners alternated turns every two taps. Findings revealed that partners did not achieve the same level of performance accuracy or precision of inter-tap intervals (ITIs) when producing tapping sequences jointly relative to individually, despite showing learning (increased ITI accuracy and precision across the experiment) in both tasks. Strikingly, partners imposed rhythmic patterns onto jointly produced sequences that captured the temporal structure of turns. Together, learning to produce novel temporal sequences in turn with a partner appears to be more challenging than learning to produce the same sequences alone. Critically, partners may impose rhythmic structures onto turn-taking sequences as a strategy for facilitating coordination.
https://www.nature.com/articles/s41598-022-18480-6

HANNA KŐSZEGI et al – Investigating responses to object-labels in the domestic dog (Canis familiaris)
Since the dawn of comparative cognitive research, dogs were suspected to possess some capacity for responding to human spoken language. Neuroimaging studies have supported the existence of relevant mechanisms, but convincing behavioral performance is rare, with only few exceptional dogs worldwide demonstrating a lexicon of object-labels they respond to. In the present study we aimed to investigate if and how a capacity for processing verbal stimuli is expressed in dogs (N = 20), whose alleged knowledge of verbal labels is only backed-up by owner reports taken at face value, and concerning only a few words (on average 5). Dogs were tested in a two-choice paradigm with familiar objects. The experiment was divided into a cue-control condition (objects visible to the owner vs. shielded by a panel, thereby controlling the owner's ability to emit cues to the dog) and a response type condition (fetching vs. looking). Above chance performance in fetching and looking at the named object emerged on the level of the sample as a whole. Only one individual performed reliably above chance, but the group-level effect did not depend on this data point. The presence of the panel also had no influence, which supports that performance was not driven by non-verbal cues from the owners. The group-level effect suggests that in typical dogs object-label learning is an instable process, either due to the animals primarily engaging in contextual learning or possibly analogous to the early stages of implicit, statistical learning of words in humans and opposed to the rapid mapping reported in exceptional dogs with larger passive vocabulary.
https://www.nature.com/articles/s41598-023-30201-1

KONRAD RUDNICKI et al – Neuroendocrine and psychophysiological investigation of the evolutionary roots of gossip
This study investigates an evolutionary hypothesis of gossip postulating that in humans it serves a similar function as social grooming in other primates. It examines whether gossip decreases physiological markers of stress and increases markers of positive emotionality and sociability. Dyads of friends (N = 66) recruited at the university, participated in an experiment where they experienced a stressor followed by social interaction (gossip or control task). Individual levels of salivary cortisol and β-endorphins were assessed at before and after social interactions. Sympathetic activity and parasympathetic activity were monitored throughout the experiment. Individual differences in Tendency and Attitude towards Gossip were investigated as potential covariates. Gossip condition was characterized with increased sympathetic and parasympathetic activity, but did not differ in cortisol or β-endorphins levels. However, high Tendency to Gossip was associated with decreases in cortisol. Gossip was shown to be more emotionally salient than non-social talk, but the evidence with regard to lowering stress was not sufficient to support an analogy to social grooming.
https://www.nature.com/articles/s41598-023-30126-9

WEI DU et al – Mindfulness training reduces slippery slope effects in moral decision-making and moral judgment
Extant research has demonstrated the positive intrapersonal effects of mindfulness training. However, the cognitive mechanisms underlying the effects of mindfulness training on interpersonal processes are less clear. Here, we combined a randomized control mindfulness training design with computational approach to moral decision-making and moral judgments. Participants were randomly assigned to a Training group (N = 32) who received an 8-week mindfulness training or a Control group (N = 26) who waited for the same period of time. Before and after the 8-week period, participants completed a moral decision-making task, where they made tradeoff between money for themselves and unpleasant electric shocks to another person, and a moral judgment task, where they evaluated the blameworthiness of someone else's choices in the same moral decision-making task. Trait mindfulness, as measured by the Five-Facet Mindfulness Questionnaire, significantly increased from the pre- to post-training session for the Training group, but not the Control group, demonstrating the effectiveness of the mindfulness manipulation. For the Control group, participants' moral preference in both the decision-making task and the judgment task declined over time, exhibiting a "slippery slope" effect. In contrast, for the Training group, mindfulness training prevented moral preferences from declining. Computational modeling revealed that mindfulness training specifically reduced the increase in the weights of money over time in both the decision-making and judgment tasks, thereby curbing the "slippery slope" effects. These findings provide a cognitive account of the prosocial effects of mindfulness training on moral decision-making and moral judgments.
https://www.nature.com/articles/s41598-023-29614-9

PIN-YI WANG et al – Distilling functional variations for human UGT2B4 upstream region based on selection signals and implications for phenotypes of Neanderthal and Denisovan
Our previous work identified one region upstream human UGT2B4 (UDP glucuronosyltransferase family 2 member B4) which is associated with breast cancer and under balancing selection. However, the distribution, functional variation and molecular mechanism underlying breast cancer and balancing selection remain unclear. In current study, the two haplotypes with deep divergence are described by analyzing 1000 genomes project data and observed to be with high frequencies in all human populations. Through population genetics analysis and genome annotation, the potential functional region is identified and verified by reporter gene assay. Further mutagenesis indicates that the functional mutations are rs66862535 and rs68096061. Both SNPs can alter the interaction efficiency of transcription factor POU2F1 (POU class 2 homeobox 1). Through chromosome conformation capture, it is identified that the enhancer containing these two SNPs can interact with UGT2B4 promoter. Expression quantitative trait loci analysis indicates that UGT2B4 expression is dependent on the genotype of this locus. The common haplotype in human is lost in four genomes of archaic hominins, which suggests that Neanderthal and Denisovan should present relatively lower UGT2B4 expression and further higher steroid hormone level. This study provides new insight into the contribution of ancient population structure to human phenotypes.
https://www.nature.com/articles/s41598-023-29682-x

New Scientist

ARTICLES

MICHAEL MARSHALL – Was the shift to farming really the worst mistake in human history?
The notion that our ancestors' shift from a hunter-gatherer lifestyle to farming was disastrous for our health is well established, but a new study should prompt a rethink.
https://www.newscientist.com/article/mg25734270-100-was-the-shift-to-farming-really-the-worst-mistake-in-human-history/

Philosophical Transactions of the Royal Society B

PAPERS

ISABELLA BENTER MURATORE & SIMON GARNIER – Ontogeny of collective behaviour
During their lifetime, superorganisms, like unitary organisms, undergo transformations that change the machinery of their collective behaviour. Here, we suggest that these transformations are largely understudied and propose that more systematic research into the ontogeny of collective behaviours is needed if we hope to better understand the link between proximate behavioural mechanisms and the development of collective adaptive functions. In particular, certain social insects engage in self-assemblage, forming dynamic and physically connected architectures with striking similarities to developing multicellular organisms, making them good model systems for ontogenetic studies of collective behaviour. However, exhaustive time series and three-dimensional data are required to thoroughly characterize the different life stages of the collective structures and the transitions between these stages. The well-established fields of embryology and developmental biology offer practical tools and theoretical frameworks that could speed up the acquisition of new knowledge about the formation, development, maturity and dissolution of social insect self-assemblages and, by extension, other superorganismal behaviours. We hope that this review will encourage an expansion of the ontogenetic perspective in the field of collective behaviour and, in particular, in self-assemblage research, which has far-reaching applications in robotics, computer science and regenerative medicine.
https://royalsocietypublishing.org/doi/10.1098/rstb.2022.0065

ANTÓNIO M. M. RODRIGUES, JESSICA L. BARKER & ELVA J. H. ROBINSON – The evolution of intergroup cooperation
Sociality is widespread among animals, and involves complex relationships within and between social groups. While intragroup interactions are often cooperative, intergroup interactions typically involve conflict, or at best tolerance. Active cooperation between members of distinct, separate groups occurs very rarely, predominantly in some primate and ant species. Here, we ask why intergroup cooperation is so rare, and what conditions favour its evolution. We present a model incorporating intra- and intergroup relationships and local and long-distance dispersal. We show that dispersal modes play a pivotal role in the evolution of intergroup interactions. Both long-distance and local dispersal processes drive population social structure, and the costs and benefits of intergroup conflict, tolerance and cooperation. Overall, the evolution of multi-group interaction patterns, including both intergroup aggression and intergroup tolerance, or even altruism, is more likely with mostly localized dispersal. However, the evolution of these intergroup relationships may have significant ecological impacts, and this feedback may alter the ecological conditions that favour its own evolution. These results show that the evolution of intergroup cooperation is favoured by a specific set of conditions, and may not be evolutionarily stable. We discuss how our results relate to empirical evidence of intergroup cooperation in ants and primates.
https://royalsocietypublishing.org/doi/10.1098/rstb.2022.0074

JULIEN COLLET et al – Mechanisms of collective learning: how can animal groups improve collective performance when repeating a task?

Learning is ubiquitous in animals: individuals can use their experience to fine-tune behaviour and thus to better adapt to the environment during their lifetime. Observations have accumulated that, at the collective level, groups can also use their experience to improve collective performance. Yet, despite apparent simplicity, the links between individual learning capacities and a collective's performance can be extremely complex. Here we propose a centralized and broadly applicable framework to begin classifying this complexity. Focusing principally on groups with stable composition, we first identify three distinct ways through which groups can improve their collective performance when repeating a task: each member learning to better solve the task on its own, members learning about each other to better respond to one another and members learning to improve their complementarity. We show through selected empirical examples, simulations and theoretical treatments that these three categories identify distinct mechanisms with distinct consequences and predictions. These mechanisms extend well beyond current social learning and collective decision-making theories in explaining collective learning. Finally, our approach, definitions and categories help generate new empirical and theoretical research avenues, including charting the expected distribution of collective learning capacities across taxa and its links to social stability and evolution.
https://royalsocietypublishing.org/doi/10.1098/rstb.2022.0060

PLoS One

PAPERS

NESTOR MATTHEWS & FOLLY FOLIVI – Omit needless words: Sentence length perception

Short sentences improve readability. Short sentences also promote social justice through accessibility and inclusiveness. Despite this, much remains unknown about sentence length perception—an important factor in producing readable writing. Accordingly, we conducted a psychophysical study using procedures from Signal Detection Theory to examine sentence length perception in naive adults. Participants viewed real-world full-page text samples and judged whether a bolded target sentence contained more or fewer than 17 words. The experiment yielded four findings. First, naïve adults perceived sentence length in real-world text samples quickly (median = 300–400 ms) and precisely (median = ~90% correct). Second, flipping real-world text samples upside-down generated no reaction-time cost and nearly no loss in the precision of sentence length perception. This differs from the large inversion effects that characterize other highly practiced, real-world perceptual tasks involving canonically oriented stimuli, most notably face perception and reading. Third, participants significantly underestimated the length of mirror-reversed sentences—but not upside-down, nor standard sentences. This finding parallels participants' familiarity with commonly occurring left-justified right-ragged text, and suggests a novel demonstration of left-lateralized anchoring in scene syntax. Fourth, error patterns demonstrated that participants achieved their high speed, high precision sentence-length judgments by heuristically counting text lines, not by explicitly counting words. This suggests practical advice for writing instructors to offer students. When copy editing, students can quickly and precisely identify their long sentences via a line-counting heuristic, e.g., "a 17-word sentence spans about 1.5 text lines". Students can subsequently improve a long sentence's readability and inclusiveness by omitting needless words.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0282146

CAGLA AYDIN – The role of gestures in autobiographical memory

Speakers employ co-speech gestures when thinking and speaking; however, gesture's role in autobiographical episodic representations is not known. Based on the gesture-for-conceptualization framework, we propose that gestures, particularly representational ones, support episodic event representations by activating existing episodic elements and causing new ones to be formed in the autobiographical recollections. These gestures may also undertake information-chunking roles to allow for further processing during remembering, such as a sense of recollective experience. Participants (N = 41) verbally narrated three events (a past autobiographical, a future autobiographical, and a non-autobiographical event) and then rated their phenomenological characteristics. We found that, even though gesture use was not different across the three event conditions, representational gestures were positively associated with the episodic event details as well as their recollective quality within the past autobiographical event narratives. These associations were not observed in future event narrations. These findings suggest that gestures are potentially instrumental in the retrieval of details in autobiographical memories.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0281748

ISIS MESFIN et al – Evidence for Earlier Stone Age 'coastal use': The site of Dungo IV, Benguela Province, Angola

The relationship between Earlier Stone Age (ESA) hominins and the southern African coastal environment has been poorly investigated, despite the high concentration of open-air sites in marine and fluvial terraces of the coastal plain from c. 1Ma onward during the Mid-Pleistocene Transition. Southern Africa provides some of the earliest evidence of coastal subsistence strategies since the end of the Middle Pleistocene, during the Middle Stone Age (MSA). These coastal MSA sites showcase the role of coastal environments in the emergence and development of modern human behaviors. Given the high prevalence of coastal ESA sites throughout the region, we seek to question the relationship between hominins and coastal landscapes much earlier in time. In this regard, the +100 m raised beaches of the Benguela Province, Angola, are key areas as they are well-preserved and contain a dense record of prehistoric occupation from the beginning of the Middle Pleistocene, including

sites like Dungo, Mormolo, Sombreiro, Macaca and Punta das Vacas. Accordingly, this paper provides a critical review of the coastal ESA record of southern Africa and a detailed presentation of the Dungo IV site, through a qualitative technological analysis coupled with a quantitative inter-site comparison with contemporary southern African coastal plain sites. Through our detailed technological analyses, we highlight the influence of coastal lithological resources on the technical behaviors of hominin groups, and we propose the existence of a "regional adaptive strategy" in a coastal landscape more than 600 000 years ago. Finally, we argue for the integration of coastal landscapes into hominins' territories, suggesting that adaptation to coastal environments is actually a slower process which begins with "territorialization" well before the emergence and development of Homo sapiens.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0278775

RAIMUNDO N. ALENCAR JR et al – Production of multimodal signals to assert social dominance in white-lipped peccary (Tayassu pecari)

In this study we aimed to examine whether the 'redundancy' (a backup function to ensure the signal transmission) or 'multiple messages' (sensory communication system in combination) hypothesis would explain the function of multimodal communication of white-lipped peccaries (Tayassu pecari–WLPs). We also aimed to assess the individual factors (the social rank and sex of the sender) influencing the production of, and responses to unimodal and multimodal signals. We determined the social rank of 21 WLPs living in two captive groups and quantified the production of unimodal and multimodal signals when displaying threatening and submissive behaviors. WLPs most often produce multimodal signals independent of a previous unimodal signal failure, which suggests that they were adding more information, such as the sender's size, rather than merely increasing efficacy by engaging a different receiver's sensory channel. There was no effect of the sender's sex in the production of, and responses to, multimodal signals. However, the higher the sender's social rank, the greater the production of multimodal signals when WLPs were displaying threatening behaviors; whereas the lower the sender's social rank, the greater the production of multimodal signals when displaying submission behaviors. Multimodal signals elicited more non-aggressive responses than did the unimodal signals when displaying a threat. Moreover, the higher the sender's social rank, the greater the occurrence of non-aggressive responses to multimodal signals when displaying a threat; whereas the opposite occurred when displaying submission. Our findings support the 'multiple messages' hypothesis to explain the function of multimodal signaling during agonistic interactions in WLPs. Additionally, both the production of, and responses to, multimodal signals are related to the sender's social rank. These results allow us to suggest that the production of multimodal signals may have a key role in mitigating conflict and thus promoting group cohesion among white-lipped peccaries.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0280728

ELHAM GHASIDIAN et al – Modelling Neanderthals' dispersal routes from Caucasus towards east

The study of the cultural materials associated with the Neanderthal physical remains from the sites in the Caucasus, Central Asia and Siberian Altai and adjacent areas documents two distinct techno-complexes of Micoquian and Mousterian. These findings potentially outline two dispersal routes for the Neanderthals out of Europe. Using data on topography and Palaeoclimate, we generated computer-based least-cost-path modelling for the Neanderthal dispersal routes from Caucasus towards the east. In this regard, two dispersal routes have been identified: A northern route from Greater Caucasus associated with Micoquian techno-complex towards Siberian Altai and a southern route from Lesser Caucasus associated with Mousterian towards Siberian Altai via the Southern Caspian Corridor. Based on archaeological, bio- and physio-geographical data, our model hypothesises that during climatic deterioration phases (e.g. MIS 4) the connection between Greater and Lesser Caucasus was limited. This issue perhaps resulted in the separate development and spread of two cultural groups of Micoquian and Mousterian with an input from two different population sources of Neanderthal influxes: eastern and southern Europe refugia for these two northern and southern dispersal routes respectively. Of these two, we focus on the southern dispersal route, for it comprises a 'rapid dispersal route' towards east. The significant location of the Southern Caspian corridor between high mountains of Alborz and the Caspian Sea, provided a special biogeographical zone and a refugium. This exceptional physio-geographic condition brings forward the Southern Caspian corridor as a potential place of admixture of different hominin species including Neanderthals and homo sapiens.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0281978

Proceedings of the Royal Society B

PAPERS

MARIA FONTANALS-COLL et al – Stable isotope analyses of amino acids reveal the importance of aquatic resources to Mediterranean coastal hunter–gatherers

Determining the degree to which humans relied on coastal resources in the past is key for understanding long-term social and economic development, as well as for assessing human health and anthropogenic impacts on the environment. Prehistoric hunter–gatherers are often assumed to have heavily exploited aquatic resources, especially those living in regions of high marine productivity. For the Mediterranean, this view has been challenged, partly by the application of stable isotope analysis of skeletal remains which has shown more varied coastal hunter–gatherer diets than in other regions, perhaps due to its lower productivity. By undertaking a more specific analysis of amino acids from bone collagen of 11 individuals from

one of the oldest and best-known Mesolithic cemeteries in the Mediterranean, at El Collado, Valencia, we show that high levels of aquatic protein consumption were achieved. By measuring both carbon and nitrogen in amino acids, we conclude that some of the El Collado humans relied heavily on local lagoonal fish and possibly shellfish, rather than open marine species. By contrast to previous suggestions, this study demonstrates that the north-western coast of the Mediterranean basin could support maritime-oriented economies during the Early Holocene.
https://royalsocietypublishing.org/doi/10.1098/rspb.2022.1330

Science Advances

PAPERS

LAURE METZ, JASON E. LEWIS & LUDOVIC SLIMAK – Bow-and-arrow, technology of the first modern humans in Europe 54,000 years ago at Mandrin, France

Consensus in archaeology has posited that mechanically propelled weapons, such as bow-and-arrow or spear-thrower-and-dart combinations, appeared abruptly in the Eurasian record with the arrival of anatomically and behaviorally modern humans and the Upper Paleolithic (UP) after 45,000 to 42,000 years (ka) ago, while evidence for weapon use during the preceding Middle Paleolithic (MP) in Eurasia remains sparse. The ballistic features of MP points suggest that they were used on hand-cast spears, whereas UP lithic weapons are focused on microlithic technologies commonly interpreted as mechanically propelled projectiles, a crucial innovation distinguishing UP societies from preceding ones. Here, we present the earliest evidence for mechanically propelled projectile technology in Eurasia from Layer E of Grotte Mandrin 54 ka ago in Mediterranean France, demonstrated via use-wear and impact damage analyses. These technologies, associated with the oldest modern human remains currently known from Europe, represent the technical background of these populations during their first incursion into the continent.
https://www.science.org/doi/full/10.1126/sciadv.add4675

Trends in Cognitive Sciences

PAPERS

BIYU J. HE – Towards a pluralistic neurobiological understanding of consciousness

Theories of consciousness are often based on the assumption that a single, unified neurobiological account will explain different types of conscious awareness. However, recent findings show that, even within a single modality such as conscious visual perception, the anatomical location, timing, and information flow of neural activity related to conscious awareness vary depending on both external and internal factors. This suggests that the search for generic neural correlates of consciousness may not be fruitful. I argue that consciousness science requires a more pluralistic approach and propose a new framework: joint determinant theory (JDT). This theory may be capable of accommodating different brain circuit mechanisms for conscious contents as varied as percepts, wills, memories, emotions, and thoughts, as well as their integrated experience.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00042-6

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