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NOTICES

PUBLICATION ALERTS

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

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

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

ACADEMIA.EDU – Chinese Palaeolithic Challenges for Interpretations of Palaeolithic Archaeology

Anthropologie LIII:1–2, 77-92 (2015).

OFER BAR-YOSEF – Chinese Palaeolithic Challenges for Interpretations of Palaeolithic Archaeology

The development of prehistoric studies in Europe and Western Asia has powerfully influenced the terminology and conceptual frameworks of Palaeolithic archaeology. However, attempts to impose these on archaeological records elsewhere, such as East Asia, risk seriously distorting interpretations of the material and a failure to appreciate its significance. In particular, the Chinese Palaeolithic record provides major contrasts with that of Europe and Western Asia, and challenges prevailing notions of hominins' cognitive and adaptative capabilities based primarily on the lithic analysis. Early hominins beyond Africa were not tied to savanna environments and were able to exploit a range of habitats as a result of the flexibility afforded them by social and cognitive developments. Similarly, cultural influences conserved stone technologies, so that there is no necessary link between tool forms, cognitive ability and habitat characteristics. However,

study of tool reduction sequences provides insights into the learning processes underlying the production of particular assemblages. Core and flake industries persisted in China for much of the Pleistocene, and while hand axe assemblages are known from the south of the country, they differ from those found in Europe and Africa. Levallois and several other Middle Palaeolithic industries are generally absent, although some instances are known from western and northern areas of the country. Early (> 25 kya) microlithic industries occur in north China, with late cobble tool assemblages in the south, probably coincident with the extent of bamboo forests. South China also provides examples of pottery from Upper Palaeolithic contexts dating from < 20 kya. The implications of these distinctive aspects of the Chinese archaeological record for understanding past human behaviors are briefly discussed, as are some more general issues associated with modeling early human cognition.

https://www.academia.edu/12664053/CHINESE_PALAEOLITHIC_CHALLENGES_FOR_INTERPRETATIONS_OF_PALAEOLITHIC_ARCHAEOLOGY

ACADEMIA.EDU – BIFACE Distributions and the Movius Line: A Southeast Asian perspective

Australian Archaeology 74, 32-46 (2012).

ADAM BRUMM & MARK W. MOORE – BIFACE Distributions and the Movius Line: A Southeast Asian perspective

The 'Movius Line' is the putative technological demarcation line mapping the easternmost geographical distribution of Acheulean bifacial tools. It is traditionally argued by proponents of the Movius Line that 'true' Acheulean bifaces, especially handaxes, are only found in abundance in Africa and western Eurasia, whereas in eastern Asia, in front of the 'line', these implements are rare or absent altogether. Here we argue, however, that the Movius Line relies on classifying undated surface bifaces as Acheulean on typological grounds alone, a long-standing and widely accepted practice in Africa and western Eurasia, but one that is not seen as legitimate in eastern Asian contexts. A review of the literature shows that bifaces are relatively common as surface finds in Southeast Asia and on this basis we argue that the Movius Line is in need of reassessment.

https://www.academia.edu/1259545/Biface_distributions_and_the_Movius_Line_A_Southeast_Asian_perspective

ACADEMIA.EDU – The South Asian Paleolithic Record and Its Potential for Transitions Studies

In M. Camps, P. Chauhan (eds.), Sourcebook of Paleolithic Transitions, Springer Science (2009).

PARTH R. CHAUHAN – The South Asian Paleolithic Record and Its Potential for Transitions Studies

Abstract The Indian subcontinent contains a rich and continuous behavioral record of hominin occupation since at least the early Middle Pleistocene. All lithic assemblages demonstrate the presence of Lower, Middle, and Upper Paleolithic features and variable patterns of blank reduction, being in general congruence with other parts of the Old World. However, empirical lacunae continue to persist, such as the lack of absolute dates for many important sites and well-excavated spatial information. As a result, it has been challenging to assess the timings and nature of these technological transitions and compare that data with other regions. Although broad ages have been assigned to most assemblages on the basis of lithic typology, stratigraphy, and biochronology, they are inadequate when discussing the precise causes of the behavioral shifts and resulting adaptive strategies. Accumulated data, to date, reflect diverse techniques of raw material acquisition, transport, and reduction. The few stratified sites that have yielded evidence of technological phases include both open-air and rock-shelter/cave contexts. Both the Lower to Middle and Middle to Upper Paleolithic transitions vary at an interregional level, particularly in peninsular India. This probably reflects the collective impact of a suite of factors: demography, raw material type, topographical prominence, water resources, cognitive capabilities, mobility and settlement patterns, and subsequent hominin dispersals from peripheral regions. This paper discusses the dynamic character of the archaeological record in Pleistocene South Asia and attempts to highlight key behavioral changes. From a broader comparative perspective, the general contextual, technological, and chronological attributes are also discussed for the best-known sites.

https://www.academia.edu/1261941/The_South_Asian_Paleolithic_record_and_its_potential_for_transitions_studies

RESEARCHGATE – Graeber, David (1961–2020)

The International Encyclopedia of Anthropology, Edited by Hilary Callan & Simon Coleman (eds.), John Wiley & Sons (2021).

CHRIS KNIGHT – Graeber, David (1961–2020)

David Graeber was that rare thing—a popular anthropologist. His best-known book, *Debt: The First 5,000 Years*, was a publishing sensation. Graeber had a highly original anarchist take on his discipline, much influenced by his fieldwork experience in Madagascar. He wrote prolifically in a variety of fields while teaching in the United States and subsequently in the United Kingdom. He died suddenly in Venice in 2020.

https://www.researchgate.net/publication/357712883_Graeber_David_1961-2020

CONFERENCE ALERT – 4th Evolutionary System Biology (Virtual Conference)

Extended Call for Papers

The deadline for submission to Joint Conference on Language Evolution (Kanazawa, Japan, September 5th-8th, 2022) has been EXTENDED to February 15th, 2022.

You can submit to Joint Conference on Language Evolution via EasyChair: <https://easychair.org/conferences/?conf=icole2022>

Please carefully read the guidelines at <https://sites.google.com/view/joint-conf-language-evolution/submission> - and further details within the provided submission templates - to prepare your submission. In addition to your submission, you will be asked to provide a 150-word summary of your contribution.

If you have a problem with your submission, please email rie.asano@uni-koeln.de

Submissions may be in any relevant discipline, and should aim to make clear their own substantive claim relating to relevant, current scientific literature in the field of language evolution. Submissions which do not have clear relevance to the field or do not adhere to the guidelines may be rejected without review.

The conference languages at Joint Conference on Language Evolution will be English and American Sign Language or International Sign for one parallel session of the conference.

We are excited to announce 12 confirmed keynote and invited presenters!

KEYNOTE PRESENTERS:

Cedric Boeckx, Kazuo Okanoya, Carol Padden, and Simone Pika

INVITED PRESENTERS:

Judith Burkart, Zanna Clay, Koji Fujita, Takashi Hashimoto, Yasuo Ihara, Harumi Kobayashi, Aniruddh Patel, and Limor Raviv

All submission information and templates can be found here: <https://sites.google.com/view/joint-conf-language-evolution/submission>.

CONFERENCE ALERT – European Society for Evolutionary Developmental Biology Conference

Dear EvoDevo enthusiasts,

We are happy to confirm that - for the first time in several years – it will be possible to hold our traditional EED Conference as an in-person meeting again. The conference will take place in the beautiful city of Naples, Italy, *from May 31 to June 3*. Our Italian friends say this is the best time of the year!

The EED Society and the Local Organizing Committee have prepared an exciting program that covers many of the current hot topics in evo-devo. Please visit the conference website <https://www.evodevonapoli.eu/> that contains all the necessary information and provides links to registration and abstract submission. Note that the deadlines for abstract submission and early-bird registration are approaching rapidly!

We look forward to seeing you all in Naples,

The local organizing committee of the EED Conference

The executive committee of the European Society for Evolutionary Developmental Biology

EED Society eed.soc@gmail.com

NEWS

BREAKING SCIENCE – Chimpanzees Regularly Capture Insects and Apply Them onto Wounds

In a new paper published this week in the journal Current Biology, University of Osnabrück's Dr. Simone Pika and colleagues report the first observations of chimpanzees applying insects to their own open wounds and to the wounds of conspecifics.

<http://www.sci-news.com/biology/chimpanzee-self-medication-10529.html>

BREAKING SCIENCE – 54kyo Molar is Earliest Evidence of Anatomically Modern Humans in West Europe

In a new paper published this week in the journal Science Advances, paleoanthropologists report hominin fossils from Grotte Mandrin in France that reveal the presence of anatomically modern Homo sapiens in Europe between 56,800 and 51,700 years ago.

<http://www.sci-news.com/archaeology/grotte-mandrin-molar-10544.html>

NATURE BRIEFING – Are these Europe's first Homo sapiens?

Archaeologists say they have found evidence that Homo sapiens lived briefly in a rock shelter in southern France — before mysteriously vanishing. New research suggests that distinctive stone tools and a lone child's tooth were left by our species during a short stay some 54,000 years ago — and not by Neanderthals, who lived in the rock shelter for thousands of years before and after that time. The Homo sapiens occupation, which researchers estimate lasted for just a few decades, pre-dates the previous earliest known evidence of the species in Europe by around 10,000 years. But not everyone is convinced, and the tooth's DNA has not been analysed to confirm its origins.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=dee027b5b3&e=1db4b9a19b>

SCIENCE DAILY – Chimpanzee mother seen applying an insect to a wound on her son

Researchers have observed chimpanzees in Gabon, West Africa applying insects to their wounds and the wounds of others. Scientists describe this wound-tending behavior and argue that it is evidence that chimpanzees have the capacity for prosocial behaviors that have been linked with empathy in humans.

<https://www.sciencedaily.com/releases/2022/02/220207112645.htm>

SCIENCE DAILY – Monkeys, like people, can 'choke under pressure'

Being stressed about doing well on a test might not be limited to humans, according to a new study.

<https://www.sciencedaily.com/releases/2022/02/220208143315.htm>

SCIENCE DAILY – Golfing cockatoos reveal ability to use combined tools

Cockatoos have shown an extraordinary ability to complete a task by combining simple tools, demonstrating that this cognitive ability is not found only in primates.

<https://www.sciencedaily.com/releases/2022/02/220208105232.htm>

SCIENCE DAILY – Words are needed to think about numbers, study suggests

Researchers have found a new relationship between counting ability of Tsimane' individuals and their ability to perform matching tasks that involve numbers up to about 25. The results suggest that in order to think about exact numbers, people need to have a word for that number.

<https://www.sciencedaily.com/releases/2022/02/220208191741.htm>

SCIENCE DAILY – Context-dependent behavior can make cooperation flourish

People adopt different social behavior depending on the context they're in. A deeply generous friend may be a cutthroat colleague, for example. Using a game theory framework, researchers find that context-dependent behavior doesn't stop cooperation from flourishing, especially when behavioral strategies can 'spillover' between social settings.

<https://www.sciencedaily.com/releases/2022/02/220209154921.htm>

SCIENCE DAILY – Writing is not present in all 'complex' societies, but it can signal inequality

For a long time, anthropologists believed that a written language was a hallmark of a society being complex or 'advanced.' A new study on precolonial Mesoamerican societies shows that you can have a society with a big population and a complex government without a writing system. However, societies with writing systems tended to be less egalitarian than ones without.

<https://www.sciencedaily.com/releases/2022/02/220211102706.htm>

SCIENCE NEWS – Did Neanderthals and modern humans take turns living in a French cave?

Broken baby tooth suggests early start for our species in Europe.

<https://www.science.org/content/article/did-neanderthals-and-modern-humans-take-turns-living-french-cave>

SCIENCE NEWS – Chimps 'treat' each other's wounds with insects

Newly observed behavior shows empathy, scientists say.

<https://www.science.org/content/article/chimps-treat-each-other-s-wounds-insects>

SOCIETY FOR SCIENCE – H.sapiens may have reached Europe 10k years earlier than previously thought

Archaeological finds in an ancient French rock-shelter suggest migrations to the continent started long before Neandertals died out.

<http://click.societyforscience->

email.com/?qs=e96709d7bd5a5abb0233b92f77e37c6e3d09d11ebeae2973a3641a05fa3e54186197241c00c537c1cc809f447d5a087d24f77b22a7cf953f27630b9d36682316

THE CONVERSATION – Chimpanzees rub insects on open wounds – treating others not uniquely human?

How Rekambo chimpanzees demonstrate a number of ground breaking behaviours never seen before in animals.

<https://theconversationuk.cmail20.com/t/r-l-truddjyd-khhlilahh-p/>

PUBLICATIONS

Animal Behaviour

PAPERS

ANDREW T. SMITH & F. STEPHEN DOBSON – Social complexity in plateau pikas, *Ochotona curzoniae*

We investigated factors leading to variation in social complexity or 'social systems' among plateau pika family groups within a contiguous local population across 2 years. Plateau pikas are small, diurnal, nonhibernating, sexually monomorphic lagomorphs that occupy family home ranges on open alpine meadows on the Qinghai-Tibetan Plateau. Expression of the social organization, social structure, mating system and parental care system in plateau pikas did not follow expectations from traditional ecological or evolutionary explanations. Variability in plateau pika family group size and the transitions of group size between years allowed us to investigate potential advantages and disadvantages of group living. Evidence that

group living served to protect pikas against predation was weak. Although social huddling could have minimized thermoregulatory costs during the extremely cold Tibetan winters, there was no correlation of overwinter survivorship among pika families of different sizes. There was no apparent group-living benefit with regard to foraging, and the occurrence of cohesive social families on the flat, continuous meadow contradicts the hypothesis that sociality is related to patchiness of critical resources. Cost of maintaining burrows appeared unrelated to group size. Most interactions between pikas occurred within family groups and were affiliative (99% of adult interactions; 97% of adult–juvenile interactions), and most interactions between adult males of different family groups were aggressive (96% of interactions). Matings were primarily within families (88% of copulations). Pikas also possess a complex vocal repertoire that enhanced interactions within social families. Demographic constraints associated with variable overwinter survivorship appeared to be the dominant precondition that produced a given family size and mating system type, coupled with selective dispersal by some pikas before the start of the breeding season. Paternal care enhanced juvenile survival, and thus led to an equalization of reproductive success among adults in families with different mating combinations.

<https://www.sciencedirect.com/science/article/abs/pii/S0003347221003766>

MATTHEW J. HASENJAGER, WILLIAM HOPPITT & ELLOUISE LEADBEATER – Do honey bees modulate dance following according to foraging distance?

Honey bees famously use waggle dances to communicate foraging locations to nestmates in the hive, thereby recruiting them to those sites. The decision to dance is governed by rules that, when operating collectively, are assumed to direct foragers to the most profitable locations with little input from potential recruits, who are presumed to respond similarly to any dance regardless of its information content. Yet, variation in receiver responses can qualitatively alter collective outcomes. Here, we use network-based diffusion analysis to compare the collective influence of dance information during recruitment to feeders at different distances. We further assess how any such effects might be achieved at the individual level by dance followers either persisting with known sites when novel targets are distant and/or seeking more accurate spatial information to guide long-distance searches. Contrary to predictions, we found little evidence that dance followers' responses depended on target distance over the foraging distances considered here (100–500 m). While dance information was always key to feeder discovery, its importance did not vary with feeder distance, and bees were in fact quicker to abandon previously rewarding sites for distant alternatives. These findings provide empirical support for the long-standing assumption that self-organized foraging by honey bee colonies relies heavily on signal performance rules with limited input from recipients.

<https://www.sciencedirect.com/science/article/abs/pii/S0003347221003869>

Current Biology

PAPERS

JEAN-RÉMY HOCHMANN & SID KOUIDER – Acceleration of information processing en route to perceptual awareness in infancy

Electrophysiological studies have suggested an acceleration in information processing in the first years of life, probably largely caused by the progressive myelination of the cortex. Here, we ask whether and how this acceleration affects information processes that contribute to perceptual awareness. We addressed this issue leveraging on the attentional blink phenomenon in infants, children, and adult participants. When two visual targets (T1 and T2) are to be detected, the observer often misses T2, if it appears shortly after T1, as if the observer's attention blinked. This phenomenon is explained by the two-stage model of perception, where an early unconscious sensory stage is followed by a late and central stage that relies on limited attentional resources. Although both T1 and T2 are processed in the earlier sensory stage, the capacity limits of the second stage are such that T2 cannot be processed as long as attention is occupied by T1. The duration of the attentional blink, thus, indexes the speed of the late processing stage of visual stimuli, which is associated with perceptual awareness. Indeed, in adults, the blink only occurs if T1 is consciously perceived but not when it is missed or processed subliminally. Accordingly, neuroimaging studies have shown that late processes blocked by T1 involve frontoparietal areas, thought to be responsible for global cognitive availability, conscious access, and reportability. Here, we show that the attentional blink is present in young infants, suggesting that the two-stage organization of perception is in place at 5 and 8 months of age. In addition, we show that the duration of the attentional blink shrinks with development, suggesting that a fundamental aspect of cognitive development is the fast acceleration of the late processing stage of perception.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)00040-9](https://www.cell.com/current-biology/fulltext/S0960-9822(22)00040-9)

eLife

PAPERS

YANNICK BECKER et al – Broca area homologue's asymmetry reflects gestural communication lateralisation in monkeys (*Papio anubis*)

Manual gestures and speech recruit a common neural network, involving Broca's area in the left hemisphere. Such speech-gesture integration gave rise to theories on the critical role of manual gesturing in the origin of language. Within this evolutionary framework, research on gestural communication in our closer primate relatives has received renewed attention for investigating its potential language-like features. Here, using in-vivo anatomical MRI in 50 baboons, we found that communicative gesturing is related to Broca homologue's marker in monkeys, namely the ventral portion of the inferior

Arcuate sulcus (IA sulcus). In fact, both direction and degree of gestural communication's handedness - but not handedness for object manipulation - are associated and correlated with contralateral depth asymmetry at this exact IA sulcus portion. In other words, baboons that prefer to communicate with their right hand have a deeper left-than-right IA sulcus, than those preferring to communicate with their left hand and vice versa. Interestingly, in contrast to handedness for object manipulation, gestural communication's lateralisation is not associated to the Central sulcus depth asymmetry, suggesting a double dissociation of handedness' types between manipulative action and gestural communication. It is thus not excluded that this specific gestural lateralisation signature within the baboons' frontal cortex might reflect a phylogenetical continuity with language-related Broca lateralisation in humans.

<https://elifesciences.org/articles/70521>

Evolutionary Human Sciences

PAPERS

E. REINDL et al – Young children spontaneously invent three different types of associative tool use behaviour

Associative tool use (ATU) describes the use of two or more tools in combination, with the literature further differentiating between Tool set use, Tool composite use, Sequential tool use and Secondary tool use. Research investigating the cognitive processes underlying ATU has shown that some primate and bird species spontaneously invent Tool set and Sequential tool use. Yet studies with humans are sparse. Whether children are also able to spontaneously invent ATU behaviours and at what age this ability emerges is poorly understood. We addressed this gap in the literature with two experiments involving preschoolers (E1: N = 66, 3y 6m - 4y 9m; E2: N = 119, 3y 0m - 6y 10m) who were administered novel tasks measuring Tool set, Metatool, and Sequential tool use. Participants needed to solve the tasks individually, without the opportunity for social learning (except for enhancement effects). Children from 3 years of age spontaneously invented all types of investigated ATU behaviours. Success rates were low, suggesting that individual invention of ATU in novel tasks is still challenging for preschoolers. We discuss how future studies can use and expand our tasks to deepen our understanding of tool use and problem-solving in humans and non-human animals.

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/young-children-spontaneously-invent-three-different-types-of-associative-tool-use-behaviour/F8A277B70CA8DFEC6A5B8CB1EAFA09A5>

Nature

NEWS

Evidence of Europe's first Homo sapiens found in French cave

Stone artefacts and tooth pre-date the earliest known evidence of the species in Europe by more than 10,000 years.

<https://www.nature.com/articles/d41586-022-00389-9>

Nature Africa

NEWS

Dating Homo sapiens fossils from eastern Africa

Material surrounding fossils found to be older than presumed.

<https://www.nature.com/articles/d44148-022-00020-z>

Nature Reviews Psychology

PAPERS

RANDALL K. JAMIESON et al – Instance theory as a domain-general framework for cognitive psychology

The dominant view in cognitive psychology is that memory includes several distinct and separate systems including episodic memory, semantic memory and associative learning, each with a different set of representations, explanatory principles and mechanisms. In opposition to that trend, there is a renewed effort to reconcile those distinctions in favour of a cohesive and integrative account of memory. According to instance theory, humans store individual experiences in episodic memory and general-level and semantic knowledge such as categories, word meanings and associations emerge during retrieval. In this Perspective, we review applications of instance theory from the domains of remembering, language and associative learning. We conclude that instance theory is a productive candidate for a general theory of cognition and we propose avenues for future work that extends instance theory into the domain of cognitive computing, builds hybrid instance models and builds bridges to cognitive neuroscience.

<https://www.nature.com/articles/s44159-022-00025-3>

ARTICLES

IRIS VAN ROOIJ – Psychological models and their distractors

The lack of models in psychology hinders scientific progress. To start addressing this problem, we need a clear understanding of what models are and what they are not.

<https://www.nature.com/articles/s44159-022-00031-5>

New Scientist

NEWS

Chimpanzees spotted apparently using insects to treat their wounds

Chimps at Loango National Park in Gabon apply small winged insects to their wounds in an apparent form of self-medication, but it is unclear why.

<https://www.newscientist.com/article/2307387-chimpanzees-spotted-apparently-using-insects-to-treat-their-wounds/#ixzz7KW3oif6C>

What myths of warrior women tell us about identity and gender politics

From Amazon warriors to pugilistic matriarchs, stories of female fighters abound. Where do they come from and what can they tell us about gender equality, past, present and future.

<https://www.newscientist.com/article/mg25333730-100-what-myths-of-warrior-women-tell-us-about-identity-and-gender-politics/#ixzz7KW45Lt2k>

Japanese and English language folk songs evolved in the same way

Japanese folk songs evolved in the same way as those sung in English even though there are significant cultural differences in musical tone and scales.

<https://www.newscientist.com/article/2307192-japanese-and-english-language-folk-songs-evolved-in-the-same-way/#ixzz7KW4lf39Z>

PLoS One

PAPERS

ZIYUN ZHANG, CAROLYN MCGETTIGAN & MICHEL BELYK – Speech timing cues reveal deceptive speech in social deduction board games

The faculty of language allows humans to state falsehoods in their choice of words. However, while what is said might easily uphold a lie, how it is said may reveal deception. Hence, some features of the voice that are difficult for liars to control may keep speech mostly, if not always, honest. Previous research has identified that speech timing and voice pitch cues can predict the truthfulness of speech, but this evidence has come primarily from laboratory experiments, which sacrifice ecological validity for experimental control. We obtained ecologically valid recordings of deceptive speech while observing natural utterances from players of a popular social deduction board game, in which players are assigned roles that either induce honest or dishonest interactions. When speakers chose to lie, they were prone to longer and more frequent pauses in their speech. This finding is in line with theoretical predictions that lying is more cognitively demanding. However, lying was not reliably associated with vocal pitch. This contradicts predictions that increased physiological arousal from lying might increase muscular tension in the larynx, but is consistent with human specialisations that grant *Homo sapiens sapiens* an unusual degree of control over the voice relative to other primates. The present study demonstrates the utility of social deduction board games as a means of making naturalistic observations of human behaviour from semi-structured social interactions.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0263852>

PATRICK J. ERRINGTON, MELISSA THYE & DANIEL MIRMAN – Difficulty and pleasure in the comprehension of verb-based metaphor sentences: A behavioral study

What is difficult is not usually pleasurable. Yet, for certain unfamiliar figurative language, like that which is common in poetry, while comprehension is often more difficult than for more conventional language, it is in many cases more pleasurable. Concentrating our investigation on verb-based metaphors, we examined whether and to what degree the novel variations (in the form of verb changes and extensions) of conventional verb metaphors were both more difficult to comprehend and yet induced more pleasure. To test this relationship, we developed a set of 62 familiar metaphor stimuli, each with corresponding optimal and excessive verb variation and metaphor extension conditions, and normed these stimuli using both objective measures and participant subjective ratings. We then tested the pleasure-difficulty relationship with an online behavioral study. Based on Rachel Giora and her colleagues' 'optimal innovation hypothesis', we anticipated an inverse U-shaped relationship between ease and pleasure, with an optimal degree of difficulty, introduced by metaphor variations, producing the highest degree of pleasure when compared to familiar or excessive conditions. Results, however, revealed a more complex picture, with only metaphor extension conditions (not verb variation conditions) producing the anticipated pleasure effects. Individual differences in semantic cognition and verbal reasoning assessed using the Semantic Similarities Test, while clearly influential, further complicated the pleasure-difficulty relationship, suggesting an important avenue for further investigation.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0263781>

CHAD C. TOSSELL et al with SCOTT ATRAN – Spiritual over physical formidability determines willingness to fight and sacrifice through loyalty in cross-cultural populations

Across 11 studies involving six countries from four continents ($n = 3,285$), we extend insights from field investigations in conflict zones to offline and online surveys to show that personal spiritual formidability—the conviction and immaterial resources (values, strengths of beliefs, character) of a person to fight—is positively associated with the will to fight and sacrifice for others. The physical formidability of groups in conflict has long been promoted as the primary factor in human decisions to fight or flee in times of conflict. Here, studies in Spain, Iraq, Lebanon, Palestine, and Morocco reveal that personal spiritual formidability, a construct distinct from religiosity, is more strongly associated with the willingness to fight and make costly self-sacrifices for the group than physical formidability. A follow-on study among cadets of the US Air Force Academy further indicates that this effect is mediated by a stronger loyalty to the group, a finding replicated in a separate study with a European sample. The results demonstrate that personal spiritual formidability is a primary determinant of the will to fight across cultures, and this individual-level factor, propelled by loyal bonds made with others, disposes citizens and combatants to fight at great personal risk.

<https://www.pnas.org/content/119/6/e2113076119.abstract>

LEONARDO FERNANDINO et al – Decoding the information structure underlying the neural representation of concepts

The nature of the representational code underlying conceptual knowledge remains a major unsolved problem in cognitive neuroscience. We assessed the extent to which different representational systems contribute to the instantiation of lexical concepts in high-level, heteromodal cortical areas previously associated with semantic cognition. We found that lexical semantic information can be reliably decoded from a wide range of heteromodal cortical areas in the frontal, parietal, and temporal cortex. In most of these areas, we found a striking advantage for experience-based representational structures (i.e., encoding information about sensory-motor, affective, and other features of phenomenal experience), with little evidence for independent taxonomic or distributional organization. These results were found independently for object and event concepts. Our findings indicate that concept representations in the heteromodal cortex are based, at least in part, on experiential information. They also reveal that, in most heteromodal areas, event concepts have more heterogeneous representations (i.e., they are more easily decodable) than object concepts and that other areas beyond the traditional “semantic hubs” contribute to semantic cognition, particularly the posterior cingulate gyrus and the precuneus.

<https://www.pnas.org/content/119/6/e2108091119.abstract>

VITALY VANCHURIN et al – Thermodynamics of evolution and the origin of life

We outline a phenomenological theory of evolution and origin of life by combining the formalism of classical thermodynamics with a statistical description of learning. The maximum entropy principle constrained by the requirement for minimization of the loss function is employed to derive a canonical ensemble of organisms (population), the corresponding partition function (macroscopic counterpart of fitness), and free energy (macroscopic counterpart of additive fitness). We further define the biological counterparts of temperature (evolutionary temperature) as the measure of stochasticity of the evolutionary process and of chemical potential (evolutionary potential) as the amount of evolutionary work required to add a new trainable variable (such as an additional gene) to the evolving system. We then develop a phenomenological approach to the description of evolution, which involves modeling the grand potential as a function of the evolutionary temperature and evolutionary potential. We demonstrate how this phenomenological approach can be used to study the “ideal mutation” model of evolution and its generalizations. Finally, we show that, within this thermodynamics framework, major transitions in evolution, such as the transition from an ensemble of molecules to an ensemble of organisms, that is, the origin of life, can be modeled as a special case of bona fide physical phase transitions that are associated with the emergence of a new type of grand canonical ensemble and the corresponding new level of description.

<https://www.pnas.org/content/119/6/e2120042119.abstract>

VITALY VANCHURIN et al – Toward a theory of evolution as multilevel learning

We apply the theory of learning to physically renormalizable systems in an attempt to outline a theory of biological evolution, including the origin of life, as multilevel learning. We formulate seven fundamental principles of evolution that appear to be necessary and sufficient to render a universe observable and show that they entail the major features of biological evolution, including replication and natural selection. It is shown that these cornerstone phenomena of biology emerge from the fundamental features of learning dynamics such as the existence of a loss function, which is minimized during learning. We then sketch the theory of evolution using the mathematical framework of neural networks, which provides for detailed analysis of evolutionary phenomena. To demonstrate the potential of the proposed theoretical framework, we derive a generalized version of the Central Dogma of molecular biology by analyzing the flow of information during learning (back propagation) and predicting (forward propagation) the environment by evolving organisms. The more complex evolutionary phenomena, such as major transitions in evolution (in particular, the origin of life), have to be analyzed in the thermodynamic limit, which is described in detail in the paper by Vanchurin et al. [V. Vanchurin, Y. I. Wolf, E. V. Koonin, M. I. Katsnelson, Proc. Natl. Acad. Sci. U.S.A. 119, 10.1073/pnas.2120042119 (2022)].

<https://www.pnas.org/content/119/6/e2120037119.abstract>

PAPERS

WU LIU et al – Hominin evolution and diversity: a comparison of earlier-Middle and later-Middle Pleistocene hominin fossil variation in China

Historical views of Asia as an evolutionary ‘backwater’ are associated with the idea that *Homo erectus* experienced long periods of stasis and ultimately went extinct. However, recent discoveries of well-dated Middle Pleistocene hominin fossils in China have considerably challenged these ideas and provide sufficient data to propose a testable model that explains the patterning of variation in Middle Pleistocene China, and why it changed over time. A series of hominin fossil studies comparing earlier-Middle and later-Middle Pleistocene groups confirm that the expressions of certain traits shift around 300 ka. Fossils from the later Middle Pleistocene are more variable with a mix of archaic traits as well as ones that are common in Western Eurasian early *Homo sapiens* and Neanderthals. The period around 300 ka appears to have been a critical turning point for later-Middle Pleistocene morphological changes in China. It coincides with a phase of climatic instability in the Northern Hemisphere between Marine Isotope Stages 12 and 10 that would have led to changes in gene flow patterning, and regional population survival/extinction. This localized and testable model can be used for future explorations of hominin evolution in later Pleistocene eastern Eurasia.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0040>

KONSTANTINA MARGIOTOU DI et al with FRIEDEMANN PULVERMÜLLER – Bo-NO-bouba-kiki: picture-word mapping but no spontaneous sound symbolic speech-shape mapping in a language trained bonobo

Humans share the ability to intuitively map ‘sharp’ or ‘round’ pseudowords, such as ‘bouba’ versus ‘kiki’, to abstract edgy versus round shapes, respectively. This effect, known as sound symbolism, appears early in human development. The phylogenetic origin of this phenomenon, however, is unclear: are humans the only species capable of experiencing correspondences between speech sounds and shapes, or could similar effects be observed in other animals? Thus far, evidence from an implicit matching experiment failed to find evidence of this sound symbolic matching in great apes, suggesting its human uniqueness. However, explicit tests of sound symbolism have never been conducted with nonhuman great apes. In the present study, a language-competent bonobo completed a cross-modal matching-to-sample task in which he was asked to match spoken English words to pictures, as well as ‘sharp’ or ‘round’ pseudowords to shapes. Sound symbolic trials were interspersed among English words. The bonobo matched English words to pictures with high accuracy, but did not show any evidence of spontaneous sound symbolic matching. Our results suggest that speech exposure/comprehension alone cannot explain sound symbolism. This lends plausibility to the hypothesis that biological differences between human and nonhuman primates could account for the putative human specificity of this effect.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2021.1717>

Science

NEWS

Did Neanderthals and modern humans take turns living in a French cave?

Broken baby tooth suggests early start for our species in Europe.

<https://www.science.org/content/article/did-neanderthals-and-modern-humans-take-turns-living-french-cave>

Science Advances

PAPERS

QI SU, ALEX MCAVOY & JOSHUA B. PLOTKIN – Evolution of cooperation with contextualized behavior

How do networks of social interaction govern the emergence and stability of prosocial behavior? Theoretical studies of this question typically assume unconditional behavior, meaning that an individual either cooperates with all opponents or defects against all opponents—an assumption that produces a pessimistic outlook for the evolution of cooperation, especially in highly connected populations. Although these models may be appropriate for simple organisms, humans have sophisticated cognitive abilities that allow them to distinguish between opponents and social contexts, so they can condition their behavior on the identity of opponents. Here, we study the evolution of cooperation when behavior is conditioned by social context, but behaviors can spill over between contexts. Our mathematical analysis shows that contextualized behavior rescues cooperation across a broad range of population structures, even when the number of social contexts is small. Increasing the number of social contexts further promotes cooperation by orders of magnitude.

<https://www.science.org/doi/full/10.1126/sciadv.abm6066>

LUDOVIC SLIMAK, et al with CHRIS STRINGER – Modern human incursion into Neanderthal territories 54,000 years ago at Mandrin, France

Determining the extent of overlap between modern humans and other hominins in Eurasia, such as Neanderthals and Denisovans, is fundamental to understanding the nature of their interactions and what led to the disappearance of archaic hominins. Apart from a possible sporadic pulse recorded in Greece during the Middle Pleistocene, the first settlements of modern humans in Europe have been constrained to ~45,000 to 43,000 years ago. Here, we report hominin fossils from

Grotte Mandrin in France that reveal the earliest known presence of modern humans in Europe between 56,800 and 51,700 years ago. This early modern human incursion in the Rhône Valley is associated with technologies unknown in any industry of that age outside Africa or the Levant. Mandrin documents the first alternating occupation of Neanderthals and modern humans, with a modern human fossil and associated Neanderthalian lithic industry found stratigraphically between layers containing Neanderthal remains associated with Mousterian industries.

<https://www.science.org/doi/full/10.1126/sciadv.abj9496>

Trends in Cognitive Sciences

PAPERS

FRIEDERIKE RANGE & SARAH MARSHALL-PESCINI – Comparing wolves and dogs: current status and implications for human ‘self-domestication’

Based on claims that dogs are less aggressive and show more sophisticated socio-cognitive skills compared with wolves, dog domestication has been invoked to support the idea that humans underwent a similar ‘self-domestication’ process. Here, we review studies on wolf–dog differences and conclude that results do not support such claims: dogs do not show increased socio-cognitive skills and they are not less aggressive than wolves. Rather, compared with wolves, dogs seek to avoid conflicts, specifically with higher ranking conspecifics and humans, and might have an increased inclination to follow rules, making them amenable social partners. These conclusions challenge the suitability of dog domestication as a model for human social evolution and suggest that dogs need to be acknowledged as animals adapted to a specific socio-ecological niche as well as being shaped by human selection for specific traits.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00018-3](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00018-3)

Trends in Ecology and Evolution

PAPERS

PEIQI ZHANG et al – Denisovans and Homo sapiens on the Tibetan Plateau: dispersals and adaptations

Recent archaeological discoveries suggest that both archaic Denisovans and Homo sapiens occupied the Tibetan Plateau earlier than expected. Genetic studies show that a pulse of Denisovan introgression was involved in the adaptation of Tibetan populations to high-altitude hypoxia. These findings challenge the traditional view that the plateau was one of the last places on earth colonized by H. sapiens and warrant a reappraisal of the population history of this highland. Here, we integrate archaeological and genomic evidence relevant to human dispersal, settlement, and adaptation in the region. We propose two testable models to address the peopling of the plateau in the broader context of H. sapiens dispersal and their encounters with Denisovans in Asia.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(21\)00307-4](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(21)00307-4)

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