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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.

RESEARCHGATE – Lunarchy: the original human economics of time

In Fabio Silva & Liz Henty (eds.), Solarizing the Moon: Essays in Honour of Lionel Sims. Archaeopress (2022).

CAMILLA POWER – Lunarchy: the original human economics of time

Lionel Sims’ work has illuminated how Neolithic ritual communities ‘solarised’ the moon, deceptively transforming a lunar syntax into a solar one. But where did the ‘time-resistant’ lunar syntax come from? It is unlikely that patriarchal Neolithic societies invented this form of time-keeping. Yet it persists even in modern patriarchal ‘world’ religions derived from Neolithic forebears. Marx said ‘All forms of economics can be reduced to an economics of time’. How a society organises time reveals what it truly values. The question of the earliest human economy cannot be solved without a focus on women, the moon and menstruation. African hunter-gatherer cosmology takes the lunar cycle as the crucial timeframe for ritual, sex and economic activities. The shared sources of this cosmology carry us back to earliest human symbolic culture, the very origins of art and ritual itself, over 100,000 years ago. Contrary to presumed Neolithic gender relations, these hunter-gatherer societies are among the most gender egalitarian on earth. But how does such egalitarianism work? Women especially assert power through their bodies collectively to resist any threat of male exploitation. As the moon waxes and wanes, the dynamic of power switches in more or less playful battles between the sexes. Rather than patriarchy or matriarchy, we observe lunarchy – rule by the moon, expressed in a pulse of waxing and waning, ritual power ON, ritual power OFF.

https://www.researchgate.net/publication/362313458_Lunarchy_the_original_human_economics_of_time

HRAF SELECTED PAPERS – Language structure is partly determined by social structure

In PLoS ONE 5, e8559 (2010).

GARY LUPYAN & RICK DALE – Language structure is partly determined by social structure

This article explores the relationship between language structure and social environment, positing that linguistic factors such as morphological complexity are associated with demographic/socio-historical factors such as number of speakers, geographic spread, and degree of language contact. Data support such an association. The authors further propose a Linguistic Niche Hypothesis suggesting that “the level of morphological specialization is a product of languages adapting to the learning constraints and the unique communicative needs of the speaker population”

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0008559>

NEWS

NATURE BRIEFING – Double doctors: why get two PhDs

Earning one PhD is difficult enough — but there are the rare individuals who opt to swim extra laps in the stress pool to secure a second one. Some do it to carve out a distinct research niche for themselves, others to access resources that are unavailable in their home countries. Some might simply enjoy the challenge. Three ‘double doctors’ share what they gained — and whether it was worth it.

{I'm still searching for a supervisor for a second PhD, on the origins of metaphor, if anyone is interested.}

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=6c11bd5ea1&e=1db4b9a19b>

SCIENCE NEWS – Ancient Europeans farmed dairy—but couldn't digest milk

Over the past 10,000 years, populations living far apart in Europe, Africa, South Asia, and the Middle East separately acquired a key genetic change: the ability to digest the milk sugar lactose as adults. Researchers thought people who had that ability and lived in dairy farming cultures got a nutritional boost and had more children, thus spreading the genetic changes. But in recent years, unexpected findings—such as data from Mongolia, where people devour milk products but 95% of adults are genetically lactose intolerant—have challenged that story. Now, a study combines large archaeological data sets on dairy farming with ancient DNA and finds that across Europe, people consumed dairy for millennia before lactase persistence into adulthood was widespread.

<https://www.science.org/content/article/ancient-europeans-farmed-dairy-couldn-t-digest-milk>

SOCIETY FOR SCIENCE – Ancient DNA links an East Asian Homo sapiens woman to early Americans

An unusual hominid fossil from southwestern China is finally giving up its secrets.

<https://www.sciencenews.org/article/homo-sapiens-woman-fossil-china-ancient-dna-early-americans>

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

LAUREN F. BRASINGTON et al – The impact of Alpha Male Replacements on reproductive seasonality and synchrony in white-faced capuchins (*Cebus imitator*)

We analyzed 33 years of data on seven capuchin groups to test whether AMRs and births occur seasonally and whether birth seasonality changes following AMRs. Using sliding window analysis, we tested whether ecological conditions predict births in future months. We also tested whether birth period affects infant survival and likelihood of infanticide.

AMRs shift birth seasonality from the ecological birth peak in the early wet season (late May–July) to a social birth peak during the late dry season (March–May), but they do not affect synchrony. In addition, we found that being born in the social peak significantly decreases infant survival relative to individuals born in the ecological and nonpeak periods.

These findings suggest that Santa Rosa's predictable seasons can provide conception cues for female capuchins, but AMRs disrupt this ecological timing of conceptions. We suggest the increased infant mortality associated with the social birth peak is related to seasonal factors, including water scarcity and varying resource availability, and increased risk of infanticide, as the social birth peak overlaps with the AMR peak.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24579>

REVIEWS

PHILIPPA LEVINE – A geneticist tackles eugenics

Review of ‘Control: The dark history and troubling present of eugenics’ by Adam Rutherford, Weidenfeld & Nicholson, 2022.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24576>

Biology Letters

PAPERS

KRISTOPHER M. SMITH, IBRAHIM A. MABULLA AND COREN L. APICELLA – Hadza hunter-gatherers with greater exposure to other cultures share more with generous campmates

Humans are motivated to compete for access to valuable social partners, which is a function of their willingness to share and ability to generate resources. However, relative preferences for each trait should be responsive to socioecological conditions. Here, we test the flexibility of partner choice psychology among Hadza hunter-gatherers of Tanzania. Ninety-two Hadza ranked their campmates on generosity and foraging ability and then shared resources with those campmates. We found Hadza with greater exposure to other cultures shared more with campmates ranked higher on generosity, whereas Hadza with lower exposure showed a smaller preference for sharing with generous campmates. This moderating effect was specific to generosity—regardless of exposure, Hadza showed only a small preference for sharing with better foragers. We argue this difference in preferences is due to high exposure Hadza having more experience cooperating with others in the absence of strong norms of sharing, and thus are exposed to greater variance in willingness to cooperate among potential partners

increasing the benefits of choosing partners based on generosity. As such, participants place a greater emphasis on choosing more generous partners, highlighting the flexibility of partner preferences.

<https://royalsocietypublishing.org/doi/full/10.1098/rsbl.2022.0157>

SHENGYI WU et al – Macaques preferentially attend to intermediately surprising information

Normative learning theories dictate that we should preferentially attend to informative sources, but only up to the point that our limited learning systems can process their content. Humans, including infants, show this predicted strategic deployment of attention. Here, we demonstrate that rhesus monkeys, much like humans, attend to events of moderate surprisingness over both more and less surprising events. They do this in the absence of any specific goal or contingent reward, indicating that the behavioural pattern is spontaneous. We suggest this U-shaped attentional preference represents an evolutionarily preserved strategy for guiding intelligent organisms toward material that is maximally useful for learning.

<https://royalsocietypublishing.org/doi/full/10.1098/rsbl.2022.0144>

Current Biology

PAPERS

JAMES R. DAVIES et al – Episodic-like memory in common bottlenose dolphins

Episodic memory involves the conscious recollection of personally experienced events, which has often been argued to be a uniquely human ability. However, evidence for conscious episodic recall in humans is centered around language-based reports. With no agreed upon non-linguistic behavioral markers of consciousness, episodic-like memory therefore represents the behavioral characteristics of human episodic memory, in the absence of evidence for subjective experience during recall. Here, we provide compelling evidence for episodic-like memory in common bottlenose dolphins (*Tursiops truncatus*), based on the incidental encoding and unexpected question paradigm. This methodology aims to capture the incidental encoding characteristic of human episodic memory, in that when we recall an experience, we remember information that was trivial at the time of encoding, but was encoded automatically. We show that dolphins are able to use incidentally encoded spatial (“where”) and social (“who”) information to solve an unexpected memory task, using only a single test trial per test type, which ensured that the dolphins did not have the opportunity to semantically learn “rules” to pass the test. All participating dolphins made correct choices in both the “where” and “who” tests. These results suggest that dolphins are capable of encoding, recalling, and accessing incidental information within remembered events, which is an ability indicative of episodic memory in humans. We argue that the complex socio-ecological background of dolphins may have selected for the ability to recall both spatial and social information in an episodic-like manner.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)00991-5](https://www.cell.com/current-biology/fulltext/S0960-9822(22)00991-5)

eLife

PAPERS

DARSHANA Z NARAYANAN et al with ASIF A GHAZANFAR – Prenatal development of neonatal vocalizations

HUMAN and non-human primates produce rhythmical sounds as soon as they are born. These early vocalizations are important for soliciting the attention of caregivers. How they develop, remains a mystery. The orofacial movements necessary for producing these vocalizations have distinct spatiotemporal signatures. Therefore, their development could potentially be tracked over the course of prenatal life. We densely and longitudinally sampled fetal head and orofacial movements in marmoset monkeys using ultrasound imaging. We show that orofacial movements necessary for producing rhythmical vocalizations differentiate from a larger movement pattern that includes the entire head. We also show that signature features of marmoset infant contact calls emerge prenatally as a distinct pattern of orofacial movements. Our results establish that aspects of the sensorimotor development necessary for vocalizing occur prenatally, even before the production of sound.

<https://elifesciences.org/articles/78485>

Evolutionary Anthropology

COMMENTARIES

ERIC DELSON & CHRIS STRINGER – The naming of *Homo bodoensis* by Roksandic and colleagues does not resolve issues surrounding Middle Pleistocene human evolution

Roksandic et al. (2022) proposed the new species name *Homo bodoensis* as a replacement name for *Homo rhodesiensis* Woodward, 1921, because they felt it was poorly and variably defined and was linked to sociopolitical baggage. However, the International Code of Zoological Nomenclature includes regulations on how and when such name changes are allowed, and Roksandic et al.'s arguments meet none of these requirements. It is not permitted to change a name solely because of variable (or erroneous) later use once it has been originally defined correctly, nor can a name be modified because it is offensive to one or more authors or to be politically expedient. We discuss past usage of *H. rhodesiensis* and the relevant nomenclatural procedures, the proposed evolutionary position of *H. bodoensis*, and issues raised about decolonizing paleoanthropology. We reject *H. bodoensis* as a junior synonym, with no value from its inception.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21950>

ESTEBAN E. SARMIENTO & MARTIN PICKFORD – Muddying the muddle in the middle even more

In an Evolutionary Anthropology article Roksandic et al. (2022) propose a new middle Pleistocene hominin species *H. bodoensis* to replace a “poorly defined” *Homo heidelbergensis*. *Homo bodoensis* extends from the African Middle Pleistocene through the Levant to South-eastern Europe with all currently classified *H. heidelbergensis* fossils from western Europe subsumed into *Homo neandertalensis*. The authors claim their new species will be more clearly defined than *H. heidelbergensis* and will better describe hominin variation and evolution in the middle Pleistocene. Roksandic et al. are unable to account for some European fossils (i.e., Petralona and Arago) and provide no evidence as to how their new species meets their objectives. Fatally, they overlook the priority rule and fail to realize that *H. bodoensis* is both a junior synonym of *Homo rhodesiensis* and *Homo saldanensis*. Roksandic et al. conflate taxonomy with phylogeny, present hypotheses as facts, and harbor many systematic and evolutionary misconceptions.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21952>

PAPERS

LAURA A. VAN HOLSTEIN & ROBERT A. FOLEY – A process-based approach to hominin taxonomy provides new perspectives on hominin speciation

A longstanding debate in hominin taxonomy is that between “lumpers” and “splitters.” We argue that both approaches assume an unrealistically static model of speciation. Speciation is an extended process, of which fossils provide a record. Fossils should be interpreted in a more dynamic framework than is the norm. We introduce the process-based approach (PBA), in which we suggest that “splitters” recognize and name units at an earlier stage of speciation than “lumpers” do. The “determinants” of speciation can control the rate at which population isolates form, or the rate at which these complete the speciation process, or both. Embedded in the PBA, differences between existing lumped and split taxonomies are a heuristic tool to study these processes. We apply the PBA to show that not all hominin populations reached later stages of the speciation process and that populations have a disproportionate likelihood of doing so from ~3.1 to ~1.5 Ma. We outline and discuss resulting new research questions.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21946>

ANDRA MENEGANZIN, TELMO PIEVANI & GIORGIO MANZI – Pan-Africanism vs. single-origin of *Homo sapiens*: Putting the debate in the light of evolutionary biology

The scenario of *Homo sapiens* origin/s within Africa has become increasingly complex, with a pan-African perspective currently challenging the long-established single-origin hypothesis. In this paper, we review the lines of evidence employed in support of each model, highlighting inferential limitations and possible terminological misunderstandings. We argue that the metapopulation scenario envisaged by pan-African proponents well describes a mosaic diversification among late Middle Pleistocene groups. However, this does not rule out a major contribution that emerged from a single population where crucial derived features—notably, a globular braincase—appeared as the result of a punctuated, cladogenetic event. Thus, we suggest that a synthesis is possible and propose a scenario that, in our view, better reconciles with consolidated expectations in evolutionary theory. These indicate cladogenesis in allopatry as an ordinary pattern for the origin of a new species, particularly during phases of marked climatic and environmental instability.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.21955>

REVIEWS

GEOFFREY GUINARD – The propensity of the human species to integrate a purpose into existence and achievements

Review of ‘Meaning of Life, Human Nature, and Delusions: How Tales about Love, Sex, Races, Gods and Progress Affect Our Lives and Earth's Splendor’ by Rui Diogo. Springer, 2022.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.21953>

Frontiers in Ecology and Evolution

PAPERS

KATHLEEN COLLIER & STUART PARSONS – Syntactic properties of male courtship song in the lesser short-tailed bat, *Mystacina tuberculata*

Bats (Mammalia: Chiroptera) have sophisticated acoustic abilities adapted to many uses, including both echolocation and social vocalisations. Social vocalisations are used in a wide variety of contexts and vary greatly in acoustic arrangement and complexity. Among the most intricate are the courtship songs that males of certain species use to attract mates and advertise their qualities. To date, however, few studies have examined the phonological construction of bat songs or made a detailed assessment of the syntax used to combine different song elements. Here, we examine the syntactic construction of courtship songs in the New Zealand lesser short-tailed bat, *Mystacina tuberculata*, a highly vocal, lek-breeding species with exceptionally high song-output rates. We hypothesised that song construction in this species is both hierarchical and non-random, and demonstrates a high degree of individual variation, potentially allowing for individual recognition. We recorded the courtship songs of nine male bats and used manual classification of song components to examine the song structure. Here we examine whether the deployment of different song components is dependent on their position, and also determine the transition probabilities between different components. We find that the frequency of song-element production and the distribution of elements within songs are non-random at both the individual and population level, and that the number of

elements used per phrase differs between individuals. Overall, we demonstrate that *M. tuberculata* songs are hierarchically constructed and employ phonological syntax to build syllables and phrases. We further show that bats employ high structural similarity and conservatism in the construction of syllables, while retaining a capacity for versatility and innovation that allows for considerable individual variation and, likely, individual recognition.

<https://www.frontiersin.org/articles/10.3389/fevo.2022.907791/full>

MARIA SAGOT et al – Vocal behavior and the use of social information during roost finding

When selecting feeding, hiding, or resting areas, animals face multiple decisions with different fitness consequences. To maximize efficiency, individuals can either collect personal information, or use information gathered and transmitted by other individuals (social information). Within group living species, organisms often specialize in either generating social information or using information gathered by other groups members. That is the case of the Spix's disk-winged bat, *Thyroptera tricolor*. This species uses contact calls during roost finding. Social groups are composed by a mix of vocal and non-vocal individuals and those vocal roles appear to be consistent over time. Moreover, their vocal behavior can predict roost finding in natural settings, suggesting that vocal individuals are capable of generating social information that can be used by other group members. To date, however, we do not know if when presented with social information (contact calls) during roost finding, vocal individuals will make more or less use of these cues, compared to non-vocal individuals. To answer this question, we broadcast contact calls from a roost inside a flight cage to test whether vocal individuals could find a potential roost faster than non-vocal individuals when they encounter sounds that signal the presence of a roost site. Our results suggest that non-vocal individuals select roost sites based primarily on social information, whereas vocal individuals do not rely heavily on social information when deciding where to roost. This study provides the first link between vocal behavior and the use of social information during the search for roosting resources in bats. Incorporating ideas of social roles, and how individuals decide when and where to move based on the use of social information, may shed some light on these and other outstanding questions about the social lives of bats.

<https://www.frontiersin.org/articles/10.3389/fevo.2022.905925/full>

Frontiers in Psychology

PAPERS

P. THOMAS SCHOENEMANN – Evidence of Grammatical Knowledge in Apes: An Analysis of Kanzi's Performance on Reversible Sentences

Ape language acquisition studies have demonstrated that apes can learn arbitrary mappings between different auditory or visual patterns and concepts, satisfying the definition of symbol use. The extent to which apes understand aspects of grammar is less well accepted. On the production side, several studies have shown that apes sometimes combine two or more symbols together, in non-random patterns. However, this is quite limited compared to human language production. On the comprehension side, much greater abilities have been reported in apes. One of the most famous examples is Kanzi, a bonobo who reportedly responded correctly to a large number of novel commands. However, based on his performance on a small subset of reversible sentences—where the understanding of English syntax was critical—the extent to which he demonstrated grammatical knowledge has been questioned. Using a randomization study it is shown here that his performance actually vastly exceeds random chance, supporting the contention that he does in fact understand word order grammatical rules in English. This of course represents only one aspect of English grammar, and does not suggest he has completely human grammatical abilities. However, it does show that he understands one of the arbitrary grammatical devices used in many languages: The use of word order to code argument relations. It also removes from serious consideration the view that apes lack any kind of grammatical ability. From an evolutionary perspective, Kanzi's ability is most likely to result from homologous brain circuitry, although this is ultimately an empirical question.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.885605/full>

Journal of Language Evolution

PAPERS

JOSHUA PHILLIPS & CLAIRE BOWERN – Bayesian methods for ancestral state reconstruction in morphosyntax: Exploring the history of argument marking strategies in a large language family Get access Arrow

Bayesian phylogenetic methods have been gaining traction and currency in historical linguistics, as their potential for uncovering elements of language change is increasingly understood. Here, we demonstrate a proof of concept for using ancestral state reconstruction methods to reconstruct changes in morphology. We use a simple Brownian motion model of character evolution to test how splits in ergative marking evolve across Pama-Nyungan, a large family of Australian languages. We are able to recover linguistically plausible paths of change, as well as rejecting implausible paths. The results of these analyses elucidate constraints on changes that have led to extensive synchronic variation in an interlocking morphological system. They further provide evidence of an ergative–accusative split traceable to Proto-Pama-Nyungan.

<https://academic.oup.com/jole/article-abstract/7/1/1/6594403>

OTILIE TILSTON, ADRIAN BANGERTER & KRISTIAN TYLÉN – Teaching, sharing experience, and innovation in cultural transmission [Get access Arrow](#)

Teaching is widely understood to have an important role in cultural transmission. But cultural transmission experiments typically do not document or analyse what happens during teaching. Here, we examine the content of teaching during skill transmission under two conditions: in the presence of the artefact (no-displacement condition) and in the absence of the artefact (displacement condition). Participants built baskets from various materials to carry as much rice as possible before teaching the next participant in line. The efficacy of baskets increased over generations in both conditions, and higher performing baskets were more frequently copied; however, the weight of rice transported did not differ between conditions. Displacement affected the choice of strategy by increasing innovation. Teachers shared personal experience more to discuss non-routine events (those departing from expectations) than they did other types of teaching, especially in the presence of the artefact. Exposure to non-routine experience sharing during teaching increased subsequent innovation, supporting the idea that sharing experience through activities such as storytelling serves a sensemaking function in teaching. This study thus provides experimental evidence that sharing experience is a useful teaching method in the context of manual skill transmission.

<https://academic.oup.com/jole/article-abstract/7/1/81/6632708>

TAO GONG, LAN SHUAI & XIAOLONG YANG – A simulation on coevolution between language and multiple cognitive abilities [Get access Arrow](#)

We propose a coevolution scenario between language and two cognitive abilities, namely shared intentionality and lexical memory, under a conceptual framework that integrates biological evolution of language learners and cultural evolution of communal language among language users. Piggybacking on a well-attested agent-based model on the origin of simple lexicon and constituent word order out of holistic utterances, we demonstrate: (1) once adopted by early hominins to handle preliminary linguistic materials, along with the origin of an evolving communal language having a high mutual understandability among language users, the initially low levels of the two cognitive abilities are boosted and get ratcheted at sufficiently high levels in language users for proficient language learning and use; (2) the socio-cultural environment is indispensable for the coevolution, and natural selection (selecting highly understandable adults to produce offspring), not cultural selection (choosing highly understandable adults to teach offspring), drives the coevolution. This work modifies existing models and theories of coevolution between language and human cognition and clarifies theoretical controversies regarding the roles of natural and cultural selections on language evolution.

<https://academic.oup.com/jole/article-abstract/7/1/120/6517194>

Mind & Language

PAPERS

VÍCTOR FERNÁNDEZ-CASTRO & ELISABETH PACHERIE – Commitments and the sense of joint agency

The purpose of this article is to explore the role commitments may play in shaping our sense of joint agency. First, we propose that commitments may contribute to the generation of the sense of joint agency by stabilizing expectations and improving predictability. Second, we argue that commitments have a normative element that may bolster an agent's sense of control over the joint action and help counterbalance the potentially disruptive effects of asymmetries among agents. Finally, we discuss how commitments may contribute to make acting jointly emotionally rewarding, both by improving coordination and by inducing or reinforcing the circumstances under which shared emotions emerge among co-agents.

<https://onlinelibrary.wiley.com/doi/epdf/10.1111/mila.12433>

Nature

NEWS

How humans adapted to digest lactose — after thousands of years of milk drinking

How the ability to digest milk spread long after people started drinking it.

<https://www.nature.com/articles/d41586-022-02068-1>

ARTICLES

VIRGINIA GEWIN – Do two PhDs make twice the researcher?

Some scientists earn two PhD degrees to expand their skills, cross fields or create a niche research programme.

<https://www.nature.com/articles/d41586-022-02042-x>

EWEN CALLAWAY – How humans' ability to digest milk evolved from famine and disease

Landmark study is the first major effort to quantify how lactose tolerance developed.

<https://www.nature.com/articles/d41586-022-02067-2>

SHEVAN WILKIN – The mystery of early milk consumption in Europe

What underpins how humans evolved the capacity to consume milk during adulthood? A look at the connection between health and the genetic changes needed to break down milk offers a surprising new perspective.

<https://www.nature.com/articles/d41586-022-02041-y>

PAPERS

RICHARD P. EVERSLED et al – Dairying, diseases and the evolution of lactase persistence in Europe

In European and many African, Middle Eastern and southern Asian populations, lactase persistence (LP) is the most strongly selected monogenic trait to have evolved over the past 10,000 years. Although the selection of LP and the consumption of prehistoric milk must be linked, considerable uncertainty remains concerning their spatiotemporal configuration and specific interactions. Here we provide detailed distributions of milk exploitation across Europe over the past 9,000 years using around 7,000 pottery fat residues from more than 550 archaeological sites. European milk use was widespread from the Neolithic period onwards but varied spatially and temporally in intensity. Notably, LP selection varying with levels of prehistoric milk exploitation is no better at explaining LP allele frequency trajectories than uniform selection since the Neolithic period. In the UK Biobank cohort of 500,000 contemporary Europeans, LP genotype was only weakly associated with milk consumption and did not show consistent associations with improved fitness or health indicators. This suggests that other reasons for the beneficial effects of LP should be considered for its rapid frequency increase. We propose that lactase non-persistent individuals consumed milk when it became available but, under conditions of famine and/or increased pathogen exposure, this was disadvantageous, driving LP selection in prehistoric Europe. Comparison of model likelihoods indicates that population fluctuations, settlement density and wild animal exploitation—proxies for these drivers—provide better explanations of LP selection than the extent of milk exploitation. These findings offer new perspectives on prehistoric milk exploitation and LP evolution.

<https://www.nature.com/articles/s41586-022-05010-7>

Nature Communications

PAPERS

SÉBASTIEN BALLESTA, WEIKANG SHI & CAMILLO PADOA-SCHIOPPA – Orbitofrontal cortex contributes to the comparison of values underlying economic choices

Economic choices between goods entail the computation and comparison of subjective values. Previous studies examined neuronal activity in the orbitofrontal cortex (OFC) of monkeys choosing between different types of juices. Three groups of neurons were identified: offer value cells encoding the value of individual offers, chosen juice cells encoding the identity of the chosen juice, and chosen value cells encoding the value of the chosen offer. The encoded variables capture both the input (offer value) and the output (chosen juice, chosen value) of the decision process, suggesting that values are compared within OFC. Recent work demonstrates that choices are causally linked to the activity of offer value cells. Conversely, the hypothesis that OFC contributes to value comparison has not been confirmed. Here we show that weak electrical stimulation of OFC specifically disrupts value comparison without altering offer values. This result implies that neuronal populations in OFC participate in value comparison.

<https://www.nature.com/articles/s41467-022-32199-y>

Nature Human Behaviour

ARTICLES

NIKOLITSA GRIGOROPOULOU & MARIO L. SMALL – The data revolution in social science needs qualitative research

Although large-scale data are increasingly used to study human behaviour, researchers now recognize their limits for producing sound social science. Qualitative research can prevent some of these problems. Such methods can help to understand data quality, inform design and analysis decisions and guide interpretation of results.

<https://www.nature.com/articles/s41562-022-01333-7>

PAPERS

GABRIEL GRAND et al – Semantic projection recovers rich human knowledge of multiple object features from word embeddings

How is knowledge about word meaning represented in the mental lexicon? Current computational models infer word meanings from lexical co-occurrence patterns. They learn to represent words as vectors in a multidimensional space, wherein words that are used in more similar linguistic contexts—that is, are more semantically related—are located closer together. However, whereas inter-word proximity captures only overall relatedness, human judgements are highly context dependent. For example, dolphins and alligators are similar in size but differ in dangerousness. Here, we use a domain-general method to extract context-dependent relationships from word embeddings: ‘semantic projection’ of word-vectors onto lines that represent features such as size (the line connecting the words ‘small’ and ‘big’) or danger (‘safe’ to ‘dangerous’), analogous to ‘mental scales’. This method recovers human judgements across various object categories and properties. Thus, the geometry of word embeddings explicitly represents a wealth of context-dependent world knowledge.

<https://www.nature.com/articles/s41562-022-01316-8>

Nature Reviews Neuroscience

ARTICLES

JAKE ROGERS – A universal network

Despite the tremendous diversity of the 7,000 spoken and signed languages used daily worldwide, most of our understanding of language processing comes from studies focusing on a few dominant languages. Therefore, to what extent the language system in the brain is cross-linguistically consistent is unknown. Here, Malik-Moraleda et al. reveal that the brain responds in the same manner to typologically diverse languages and that this response is supported by the same fronto-temporo-parietal network.

<https://www.nature.com/articles/s41583-022-00627-z>

Nature Scientific Reports

PAPERS

MARIA ALEKSEEVA et al – Neurophysiological correlates of automatic integration of voice and gender information during grammatical processing

During verbal communication, interlocutors rely on both linguistic (e.g., words, syntax) and extralinguistic (e.g., voice quality) information. The neural mechanisms of extralinguistic information processing are particularly poorly understood. To address this, we used EEG and recorded event-related brain potentials while participants listened to Russian pronoun–verb phrases presented in either male or female voice. Crucially, we manipulated congruency between the grammatical gender signaled by the verbs' ending and the speakers' apparent gender. To focus on putative automatic integration of extralinguistic information into syntactic processing and avoid confounds arising from secondary top-down processes, we used passive non-attend auditory presentation with visual distraction and no stimulus-related task. Most expressed neural responses were found at both early (150 ms, ELAN-like) and late (400 ms, N400-like) phrase processing stages. Crucially, both of these brain responses exhibited sensitivity to extralinguistic information and were significantly enhanced for phrases whose voice and grammatical gender were incongruent, similar to what is known for ERPs effects related to overt grammatical violations. Our data suggest a high degree of automaticity in processing extralinguistic information during spoken language comprehension which indicates existence of a rapid automatic syntactic integration mechanism sensitive to both linguistic and extralinguistic information.

<https://www.nature.com/articles/s41598-022-14478-2>

CARMEN SALDANA et al with KENNY SMITH – Probability matching is not the default decision making strategy in human and non-human primates

Probability matching has long been taken as a prime example of irrational behaviour in human decision making; however, its nature and uniqueness in the animal world is still much debated. In this paper we report a set of four preregistered experiments testing adult humans and Guinea baboons on matched probability learning tasks, manipulating task complexity (binary or ternary prediction tasks) and reinforcement procedures (with and without corrective feedback). Our findings suggest that probability matching behaviour within primate species is restricted to humans and the simplest possible binary prediction tasks; utility-maximising is seen in more complex tasks for humans as pattern-search becomes more effortful, and we observe it across the board in baboons, altogether suggesting that it is a cognitively less demanding strategy. These results provide further evidence that neither human nor non-human primates default to probability matching; however, unlike other primates, adult humans probability match when the cost of pattern search is low.

<https://www.nature.com/articles/s41598-022-16983-w>

TATIANA V. ANDREEVA et al – Genomic analysis of a novel Neanderthal from Mezmaiskaya Cave provides insights into the genetic relationships of Middle Palaeolithic populations

The Mezmaiskaya cave is located on the North Caucasus near the border that divides Europe and Asia. Previously, fossil remains for two Neanderthals were reported from Mezmaiskaya Cave. A tooth from the third archaic hominin specimen (Mezmaiskaya 3) was retrieved from layer 3 in Mezmaiskaya Cave. We performed genome sequencing of Mezmaiskaya 3. Analysis of partial nuclear genome sequence revealed that it belongs to a *Homo sapiens neanderthalensis* female. Based on a high-coverage mitochondrial genome sequence, we demonstrated that the relationships of Mezmaiskaya 3 to Mezmaiskaya 1 and Stajnia S5000 individuals were closer than those to other Neanderthals. Our data demonstrate the close genetic connections between the early Middle Palaeolithic Neanderthals that were replaced by genetically distant later group in the same geographic areas. Based on mitochondrial DNA (mtDNA) data, we suggest that Mezmaiskaya 3 was the latest Neanderthal individual from the early Neanderthal's branches. We proposed a hierarchical nomenclature for the mtDNA haplogroups of Neanderthals. In addition, we retrieved ancestral mtDNA mutations in presumably functional sites fixed in the Neanderthal clades, and also provided the first data showing mtDNA heteroplasmy in Neanderthal specimen.

<https://www.nature.com/articles/s41598-022-16164-9>

A. FOSSAS-TENAS et al – Paradoxical effects of altruism on efforts to mitigate climate change

It is common wisdom that altruism is a crucial element in addressing climate change and other public good issues. If individuals care about the welfare of others (including future generations) they can be expected to unilaterally adapt their

behaviour to preserve the common good thus enhancing the wellbeing of all. We introduce a network game model featuring both altruism and a public good (e.g. climate) whose degradation affects all players. As expected, in an idealistic fully connected society where all players care about each other, increasing altruism results in a better protection of the public good. However, in more realistic networks where people are not all related to each other, we highlight an intrinsic trade-off between the effects of altruism on reducing inequality and the preservation of a global public good: the consumption redistribution generated by a higher altruism is partly achieved by lowering income transfers towards protection of the public good. Therefore, it increases overall consumption and is thereby detrimental to the public good. These results suggest that altruism, although good from a welfarist point of view, is not in itself sufficient to simultaneously solve public good and inequality issues.

<https://www.nature.com/articles/s41598-022-17535-y>

New Scientist

NEWS

Ancient Aboriginal rock art may reveal how Australia's climate changed

Murujuga in Western Australia holds more than 2 million engravings that have been added over at least 50,000 years - and may provide a glimpse into how the region's climate and vegetation have changed.

<https://www.newscientist.com/article/2330754-ancient-aboriginal-rock-art-may-reveal-how-australias-climate-changed/>

Philosophical Transactions of the Royal Society B

PAPERS

STEPHEN C. LEVINSON – The interaction engine: cuteness selection and the evolution of the interactional base for language

The deep structural diversity of languages suggests that our language capacities are not based on any single template but rather on an underlying ability and motivation for infants to acquire a culturally transmitted system. The hypothesis is that this ability has an interactional base that has discernable precursors in other primates. In this paper, I explore a specific evolutionary route for the most puzzling aspect of this interactional base in humans, namely the development of an empathetic intentional stance. The route involves a generalization of mother–infant interaction patterns to all adults via a process (cuteness selection) analogous to, but distinct from, RA Fisher's runaway sexual selection. This provides a cornerstone for the carrying capacity for language.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0108>

J. M. BURKART et al with C. P. VAN SCHAİK – A convergent interaction engine: vocal communication among marmoset monkeys

To understand the primate origins of the human interaction engine, it is worthwhile to focus not only on great apes but also on callitrichid monkeys (marmosets and tamarins). Like humans, but unlike great apes, callitrichids are cooperative breeders, and thus habitually engage in coordinated joint actions, for instance when an infant is handed over from one group member to another. We first explore the hypothesis that these habitual cooperative interactions, the marmoset interactional ethology, are supported by the same key elements as found in the human interaction engine: mutual gaze (during joint action), turn-taking, volubility, as well as group-wide prosociality and trust. Marmosets show clear evidence of these features. We next examine the prediction that, if such an interaction engine can indeed give rise to more flexible communication, callitrichids may also possess elaborate communicative skills. A review of marmoset vocal communication confirms unusual abilities in these small primates: high volubility and large vocal repertoires, vocal learning and babbling in immatures, and voluntary usage and control. We end by discussing how the adoption of cooperative breeding during human evolution may have catalysed language evolution by adding these convergent consequences to the great ape-like cognitive system of our hominin ancestors.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0098>

JUDITH HOLLER – Visual bodily signals as core devices for coordinating minds in interaction

The view put forward here is that visual bodily signals play a core role in human communication and the coordination of minds. Critically, this role goes far beyond referential and propositional meaning. The human communication system that we consider to be the explanandum in the evolution of language thus is not spoken language. It is, instead, a deeply multimodal, multilayered, multifunctional system that developed—and survived—owing to the extraordinary flexibility and adaptability that it endows us with. Beyond their undisputed iconic power, visual bodily signals (manual and head gestures, facial expressions, gaze, torso movements) fundamentally contribute to key pragmatic processes in modern human communication. This contribution becomes particularly evident with a focus that includes non-iconic manual signals, non-manual signals and signal combinations. Such a focus also needs to consider meaning encoded not just via iconic mappings, since kinematic modulations and interaction-bound meaning are additional properties equipping the body with striking pragmatic capacities. Some of these capacities, or its precursors, may have already been present in the last common ancestor we share with the great apes and may qualify as early versions of the components constituting the hypothesized interaction engine.

GIDEON SALTER & MALINDA CARPENTER – Showing and giving: from incipient to conventional forms

Understanding humans' motivation and capacity for social interaction requires understanding communicative gestures. Gestures are one of the earliest means that infants employ to communicate with others, and showing and giving are among the earliest-emerging gestures. However, there are limited data on the processes that lead up to the emergence of conventional showing and giving gestures. This study aimed to provide such data. Twenty-five infants were assessed longitudinally at monthly intervals from 6 to 10 months of age using a variety of methods (elicitation procedures, free play observations and maternal interviews), as well as via questionnaires conducted at 11–12 months. A particular focus was on pre-conventional, incipient gestures, behaviours that involved some components of conventional gestures, but lacked other important components. We present observational evidence that at least some of these behaviours (observed as early as 7 months of age) were communicative and make the case for how conventional showing and giving may emerge gradually in the context of social interactions. We also discuss the influence of maternal interpretations of these early behaviours on their development. Overall, the study seeks to draw attention to the importance of understanding the cognitive, motor and interactional processes that lead to the emergence of infants' earliest communicative gestures.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0102>

LORENZA MONDADA & ADRIEN MEGUERDITCHIAN – Sequence organization and embodied mutual orientations: openings of social interactions between baboons

Human interactions are organized in sequence, which is a key component of Levinson's 'interaction engine.' Referring back to the field where it originated, conversation analysis, we discuss its relevance within the interaction engine, before moving on to show how sequence organization is actually oriented to not only humans in social interaction, but also to non-human animals. On the basis of video-recorded encounters between baboons (*Papio anubis*), we study canonical sequences constituting openings and, within them, greetings. Openings are the locus where future interactants adjust to each other to coordinately enter in interaction, thus achieving a common definition of their context, activity, and relationships. The analysis shows that the ways individuals spatially approach each other provide systematic interactional affordances for how the first sequences of actions in the opening are formatted, initiated, and responded to. Adopting sequential multimodal analysis, we demonstrate how participants orient to central features of sequence organization—its sequential implicativeness and the expectations it produces—building on them their interpretations of others' actions, their responsivity, and their mutual understanding of the ongoing course of action as it unfolds. This paves the way for further reflections on the pervasiveness of the interactional engine in human and non-human primate communication.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0101>

RAPHAELA HEESSEN et al with MARK DINGEMANSE – Coordinating social action: a primer for the cross-species investigation of communicative repair

Human joint action is inherently cooperative, manifested in the collaborative efforts of participants to minimize communicative trouble through interactive repair. Although interactive repair requires sophisticated cognitive abilities, it can be dissected into basic building blocks shared with non-human animal species. A review of the primate literature shows that interactionally contingent signal sequences are at least common among species of non-human great apes, suggesting a gradual evolution of repair. To pioneer a cross-species assessment of repair this paper aims at (i) identifying necessary precursors of human interactive repair; (ii) proposing a coding framework for its comparative study in humans and non-human species; and (iii) using this framework to analyse examples of interactions of humans (adults/children) and non-human great apes. We hope this paper will serve as a primer for cross-species comparisons of communicative breakdowns and how they are repaired.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0110>

MARLEN FRÖHLICH & CAREL P. VAN SCHAIK – Social tolerance and interactional opportunities as drivers of gestural redoings in orang-utans

Communicative repair is a fundamental and universal element of interactive language use. It has been suggested that the persistence and elaboration after communicative breakdown in nonhuman primates constitute two evolutionary building blocks of this capacity, but the conditions favouring it are poorly understood. Because zoo-housed individuals of some species are more social and more terrestrial than in the wild, they should be more likely to show gestural redoings (i.e. both repetition and elaboration) after communicative failure in the coordination of their joint activities. Using a large comparative sample of wild and zoo-housed orang-utans of two different species, we could confirm this prediction for elaboration, the more flexible form of redoings. Specifically, results showed that gestural redoings in general were best predicted by the specific social action context (i.e. social play) and interaction dyad (i.e. beyond mother–offspring), although they were least frequent in captive Bornean orang-utans. For gestural elaboration, we found the expected differences between captive and wild research settings in Borneans, but not in Sumatrans (the more socially tolerant species). Moreover, we found that the effectiveness of elaboration in eliciting responses was higher in Sumatrans, especially the captive ones, whereas effectiveness of mere repetition was influenced by neither species nor setting. We conclude that the socio-ecological environment plays a central role in the emergence of communicative repair strategies in great apes.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0106>

ADRIAN BANGERTER et al with KLAUS ZUBERBÜHLER – Every product needs a process: unpacking joint commitment as a process across species

Joint commitment, the feeling of mutual obligation binding participants in a joint action, is typically conceptualized as arising by the expression and acceptance of a promise. This account limits the possibilities of investigating fledgling forms of joint commitment in actors linguistically less well-endowed than adult humans. The feeling of mutual obligation is one aspect of joint commitment (the product), which emerges from a process of signal exchange. It is gradual rather than binary; feelings of mutual obligation can vary in strength according to how explicit commitments are perceived to be. Joint commitment processes are more complex than simple promising, in at least three ways. They are affected by prior joint actions, which create precedents and conventions that can be embodied in material arrangements of institutions. Joint commitment processes also arise as solutions to generic coordination problems related to opening up, maintaining and closing down joint actions. Finally, during joint actions, additional, specific commitments are made piecemeal. These stack up over time and persist, making it difficult for participants to disengage from joint actions. These complexifications open up new perspectives for assessing joint commitment across species.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0095>

FEDERICO ROSSANO et al with KLAUS ZUBERBÜHLER – How 2- and 4-year-old children coordinate social interactions with peers

The Interaction Engine Hypothesis postulates that humans have a unique ability and motivation for social interaction. A crucial juncture in the ontogeny of the interaction engine could be around 2–4 years of age, but observational studies of children in natural contexts are limited. These data appear critical also for comparison with non-human primates. Here, we report on focal observations on 31 children aged 2- and 4-years old in four preschools (10 h per child). Children interact with a wide range of partners, many infrequently, but with one or two close friends. Four-year olds engage in cooperative social interactions more often than 2-year olds and fight less than 2-year olds. Conversations and playing with objects are the most frequent social interaction types in both age groups. Children engage in social interactions with peers frequently (on average 13 distinct social interactions per hour) and briefly (28 s on average) and shorter than those of great apes in comparable studies. Their social interactions feature entry and exit phases about two-thirds of the time, less frequently than great apes. The results support the Interaction Engine Hypothesis, as young children manifest a remarkable motivation and ability for fast-paced interactions with multiple partners.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0100>

MANUEL BOHN et al – Great ape communication as contextual social inference: a computational modelling perspective

Human communication has been described as a contextual social inference process. Research into great ape communication has been inspired by this view to look for the evolutionary roots of the social, cognitive and interactional processes involved in human communication. This approach has been highly productive, yet it is partly compromised by the widespread focus on how great apes use and understand individual signals. This paper introduces a computational model that formalizes great ape communication as a multi-faceted social inference process that integrates (a) information contained in the signals that make up an utterance, (b) the relationship between communicative partners and (c) the social context. This model makes accurate qualitative and quantitative predictions about real-world communicative interactions between semi-wild-living chimpanzees. When enriched with a pragmatic reasoning process, the model explains repeatedly reported differences between humans and great apes in the interpretation of ambiguous signals (e.g. pointing or iconic gestures). This approach has direct implications for observational and experimental studies of great ape communication and provides a new tool for theorizing about the evolution of uniquely human communication.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0096>

ALICIA P. MELIS & F. ROSSANO – When and how do non-human great apes communicate to support cooperation?

Several scholars have long suggested that human language and remarkable communicative abilities originate from the need and motivation to cooperate and coordinate actions with others. Yet, little work has focused on when and how great apes communicate during joint action tasks, partly because of the widely held assumption that animal communication is mostly manipulative, but also because non-human great apes' default motivation seems to be competitive rather than cooperative. Here, we review experimental cooperative tasks and show how situational challenges and the degree of asymmetry in terms of knowledge relevant for the joint action task affect the likelihood of communication. We highlight how physical proximity and strength of social bond between the participants affect the occurrence and type of communication. Lastly, we highlight how, from a production point of view, communicators appear capable of calibrating their signalling and controlling their delivery, showing clear evidence of first-order intentionality. On the other hand, recipients appear to struggle in terms of making use of referential information received. We discuss different hypotheses accounting for this asymmetry and provide suggestions concerning how future work could help us unveil to what degree the need for cooperation has shaped our closest living relatives' communicative behaviour.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0109>

CHRISTINE SIEVERS – Interaction and ostension: the myth of 4th-order intentionality

Research in comparative cognition on allegedly uniquely human capacities considers the identification of these human capacities in other species as one of their main points of inquiry. Capacities are applied in their theoretical descriptions to promising empirical data. The conclusion then often is that even though, on a behavioural level, the human and nonhuman cases appear related, on a cognitive level there is no relation whatsoever because the underlying cognitive states diverge in quality. This result seems dissatisfying for two reasons: (1) there is ample empirical evidence that suggests the presence of the capacities in other species, and (2) the claim that the underlying states diverge often hinges on the reference to the theoretical definitions of these capacities only. This opinion piece focuses on the capacity of ostensive intentional communication to demonstrate that the original theoretical analyses often are not befitting a comparative endeavour and should therefore not be used as pivotal reference within comparative research. An outlook will be provided on more promising approaches to identifying ostensive communication, namely an interactive approach that will allow for ostension to not be perceived as a one-turn signalling behaviour, but as interactive, with the possibility of being established in a trial-and-error manner.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0105>

MICHAEL TOMASELLO – The coordination of attention and action in great apes and humans

Great apes can discern what others are attending to and even direct others' attention to themselves in flexible ways. But they seemingly do not coordinate their attention with one another recursively—understanding that the other is monitoring their attention just as they are monitoring hers—in acts of joint attention, at least not in the same way as young human children. Similarly, great apes collaborate with partners in many flexible ways, but they seemingly do not coordinate with others to form mutually obligating joint goals and commitments, nor regulate the collaboration via acts of intentional communication, at least not in the same way as young human children. The hypothesis defended here is that it is precisely in their capacities to coordinate attention and action with others—that is, in their capacities for shared intentionality—that humans are most clearly distinguished from other great apes.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0093>

PLoS Biology

PAPERS

FAN BAI, ANTJE S. MEYER & ANDREA E. MARTIN – Neural dynamics differentially encode phrases and sentences during spoken language comprehension

Human language stands out in the natural world as a biological signal that uses a structured system to combine the meanings of small linguistic units (e.g., words) into larger constituents (e.g., phrases and sentences). However, the physical dynamics of speech (or sign) do not stand in a one-to-one relationship with the meanings listeners perceive. Instead, listeners infer meaning based on their knowledge of the language. The neural readouts of the perceptual and cognitive processes underlying these inferences are still poorly understood. In the present study, we used scalp electroencephalography (EEG) to compare the neural response to phrases (e.g., the red vase) and sentences (e.g., the vase is red), which were close in semantic meaning and had been synthesized to be physically indistinguishable. Differences in structure were well captured in the reorganization of neural phase responses in delta (approximately <2 Hz) and theta bands (approximately 2 to 7 Hz), and in power and power connectivity changes in the alpha band (approximately 7.5 to 13.5 Hz). Consistent with predictions from a computational model, sentences showed more power, more power connectivity, and more phase synchronization than phrases did. Theta–gamma phase–amplitude coupling occurred, but did not differ between the syntactic structures. Spectral–temporal response function (STRF) modeling revealed different encoding states for phrases and sentences, over and above the acoustically driven neural response. Our findings provide a comprehensive description of how the brain encodes and separates linguistic structures in the dynamics of neural responses. They imply that phase synchronization and strength of connectivity are readouts for the constituent structure of language. The results provide a novel basis for future neurophysiological research on linguistic structure representation in the brain, and, together with our simulations, support time-based binding as a mechanism of structure encoding in neural dynamics.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001713>

PLoS One

PAPERS

JULIA CABANÈS et al – Palaeolithic polyhedrons, spheroids and bolas over time and space

Polyhedrons, spheroids and bolas (PSBs) are present in lithic series from the Lower Palaeolithic onwards and are found in several regions of the world. Nevertheless, very little is known about them. We propose here to summarise, illustrate and discuss the current state of our knowledge about these artefacts. Based on the available data in the literature and on our observations of several collections, we set up a database comprising 169 Palaeolithic assemblages with PSBs. Thanks to the statistical analysis of these data, we aim to highlight potential relationships between PSB characteristics (e.g., quantity, raw material) and assemblage composition and context, according to regions and chrono-cultural attributions. We also aim to discuss the question of artefacts from possible independent local histories, especially in Northwest Europe, where these

objects are scarce. Our study concludes that hard stones (stones with high resistance to a physical constraint) available locally were generally selected to produce PSBs. Soft sedimentary rocks are suitable for their manufacture, and were selected too, whereas siliceous materials were left aside. We hypothesise that the scarcity of PSBs in Northwest Europe could result from a combination of cultural and environmental factors: it could be part of a regional tradition, influenced by the abundance of siliceous materials in the environment. In this region where the lithic production is widely made of flint, even though other materials were available, objects made from hard stones are scarce, resulting in a toolkit with only rare PSBs and cleavers. Was flint too brittle for the functions of PSBs? Raw materials of PSBs are often similar to those of heavy-duty tools in assemblages, which could provide other clues about their functions (e.g., tasks requiring a resistance to shocks). It is possible that their raw materials partly conditioned their final shape. PSBs can comprise a wide variety of artefacts, that for some could have change of status (e.g., from cores to percussive tools), diffused, adapted but also reinvented over two million years.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0272135>

ALESSANDRO CICERALE, ENRICO BLANZIERI & KATIUSCIA SACCO – How does decision-making change during challenging times?

Prospect Theory, proposed and developed by Kahneman and Tversky, demonstrated that people do not make rational decisions based on expected utility, but are instead biased by specific cognitive tendencies leading to neglect, under- or over-consider information, depending on the context of presentation. In this vein, the present paper focuses on whether and how individual decision-making attitudes are prone to change in the presence of globally challenging events. We ran three partial replications of the Kahneman and Tversky (1979) paper, focusing on a set of eight prospects, after a terror attack (Paris, November 2015, 134 subjects) and during the Covid-19 pandemic, both during the first lockdown in Italy (Spring 2020, 176 subjects) and after the first reopening (140 subjects). The results confirm patterns of choice characterizing uncertain times, as shown by previous literature. In particular, we note significant increase of risk aversion, both in the gain and in the loss domains, that consistently emerged in the three replications. Given the nature of our sample, and the heterogeneity between the three periods investigated, we suggest that the phenomenon we present can be explained stress-related effects on decision making rather than by other economic effects, such as the income effect.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0270117>

Proceedings of the Royal Society B

PAPERS

KENNA D. S. LEHMANN et al – Long-distance vocalizations of spotted hyenas contain individual, but not group, signatures

In animal societies, identity signals are common, mediate interactions within groups, and allow individuals to discriminate group-mates from out-group competitors. However, individual recognition becomes increasingly challenging as group size increases and as signals must be transmitted over greater distances. Group vocal signatures may evolve when successful in-group/out-group distinctions are at the crux of fitness-relevant decisions, but group signatures alone are insufficient when differentiated within-group relationships are important for decision-making. Spotted hyenas are social carnivores that live in stable clans of less than 125 individuals composed of multiple unrelated matrilineal groups. Clan members cooperate to defend resources and communal territories from neighbouring clans and other mega carnivores; this collective defence is mediated by long-range (up to 5 km range) recruitment vocalizations, called whoops. Here, we use machine learning to determine that spotted hyena whoops contain individual but not group signatures, and that fundamental frequency features which propagate well are critical for individual discrimination. For effective clan-level cooperation, hyenas face the cognitive challenge of remembering and recognizing individual voices at long range. We show that serial redundancy in whoop bouts increases individual classification accuracy and thus extended call bouts used by hyenas probably evolved to overcome the challenges of communicating individual identity at long distance.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2022.0548>

CASSANDRA AFSETH et al – Vertical transmission of horizontally acquired social information in sticklebacks: Implications for transgenerational plasticity

There is growing evidence that offspring receive information about their environment vertically, i.e. from their parents (environmental parental effects or transgenerational plasticity). For example, parents exposed to predation risk may produce offspring with heightened antipredator defences. At the same time, organisms can gain information about the environment horizontally, from conspecifics. In this study, we provide some of the first evidence that horizontally acquired social information can be transmitted vertically across generations. Three-spined stickleback (*Gasterosteus aculeatus*) fathers produced larval offspring with altered antipredator behaviour when fathers received visual and olfactory cues from predator-chased neighbours. Although fathers did not personally witness their neighbours being chased (i.e. they never saw the predator), changes in offspring traits were similar to those induced by direct paternal exposure to predation risk. These findings suggest that two different non-genetic pathways (horizontal transfer of social information, vertical transfer via sperm-mediated paternal effects) can combine to affect offspring phenotypes. The implications of simultaneous horizontal and vertical transmission are widely appreciated in the context of disease and culture; our results suggest that they could be

equally important for the maintenance of phenotypic variation and could have profound consequences for the rate at which information flows within and across generations.

<https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2022.0571>

CHLOE WEISE, CHRISTIAN CELY ORTIZ & ELIZABETH A. TIBBETTS – Paper wasps form abstract concept of ‘same and different’

Concept formation requires animals to learn and use abstract rules that transcend the characteristics of specific stimuli. Abstract concepts are often associated with high levels of cognitive sophistication, so there has been much interest in which species can form and use concepts. A key abstract concept is that of sameness and difference, where stimuli are classified as either the same as or different than an original stimulus. Here, we used a simultaneous two-item same-different task to test whether paper wasps (*Polistes fuscatus*) can learn and apply a same-different concept. We trained wasps by simultaneously presenting pairs of same or different stimuli (e.g. colours). Then, we tested whether wasps could apply the concept to new stimuli of the same type (e.g. new colours) and to new stimulus types (e.g. odours). We show that wasps learned a general concept of sameness or difference and applied it to new samples and types of stimuli. Notably, wasps were able to transfer the learned rules to new stimuli in a different sensory modality. Therefore, *P. fuscatus* can classify stimuli based on their relationships and apply abstract concepts to novel stimulus types. These results indicate that abstract concept learning may be more widespread than previously thought.

<https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2022.1156>

Royal Society Open Science

PAPERS

USHA GOSWAMI – Language acquisition and speech rhythm patterns: an auditory neuroscience perspective

All human infants acquire language, but their brains do not know which language/s to prepare for. This observation suggests that there are fundamental components of the speech signal that contribute to building a language system, and fundamental neural processing mechanisms that use these components, which are shared across languages. Equally, disorders of language acquisition are found across all languages, with the most prevalent being developmental language disorder (approx. 7% prevalence), where oral language comprehension and production is atypical, and developmental dyslexia (approx. 7% prevalence), where written language acquisition is atypical. Recent advances in auditory neuroscience, along with advances in modelling the speech signal from an amplitude modulation (AM, intensity or energy change) perspective, have increased our understanding of both language acquisition and these developmental disorders. Speech rhythm patterns turn out to be fundamental to both sensory and neural linguistic processing. The rhythmic routines typical of childcare in many cultures, the parental practice of singing lullabies to infants, and the ubiquitous presence of BabyTalk (infant-directed speech) all enhance the fundamental AM components that contribute to building a linguistic brain.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.211855>

CAROLIN DUDSCHIG – Are control processes domain-general? A replication of ‘To adapt or not to adapt? The question of domain-general cognitive control’ (Kan et al. 2013)

Conflict and conflict adaptation are well-studied phenomena in experimental psychology. Standard tasks investigating causes and outcomes of conflict during information processing include the Stroop, the Flanker and the Simon task. Interestingly, recent research efforts have moved toward investigating whether conflict in one task domain influences information processing in another task domain, typically referred to as cross-task conflict adaptation. These transfer effects are of central importance for theories about our cognitive architecture, as they are interpreted as pointing towards domain-general cognitive mechanisms. Given the importance of these cross-task transfer effects, the current paper targets at replicating one of the key findings. Specifically, Kan et al. (Kan et al. 2013 *Cognition*129, 637–651) showed that reading syntactically ambiguous sentences result in processing adjustments in subsequent Stroop trials. This result is in line with the idea that conflict monitoring works in a domain overarching manner. The present paper presents two replication studies: (i) exact replication: identical sentence-reading task intermixed with stimulus-based Stroop task and (ii) conceptual replication: identical sentence-reading task intermixed with response-based Stroop task. Power calculations were based on the original paper. Both experiments were pre-registered. Despite the experiments being closely designed according to the original study, there was no evidence supporting the hypothesis regarding cross-domain conflict adaptation.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.210550>

Science Advances

PAPERS

FELIPE MORA-BERMÚDEZ et al with SVANTE PÄÄBO – Longer metaphase and fewer chromosome segregation errors in modern human than Neanderthal brain development

Since the ancestors of modern humans separated from those of Neanderthals, around 100 amino acid substitutions spread to essentially all modern humans. The biological significance of these changes is largely unknown. Here, we examine all six such amino acid substitutions in three proteins known to have key roles in kinetochore function and chromosome segregation and to be highly expressed in the stem cells of the developing neocortex. When we introduce these modern human-specific

substitutions in mice, three substitutions in two of these proteins, KIF18a and KNL1, cause metaphase prolongation and fewer chromosome segregation errors in apical progenitors of the developing neocortex. Conversely, the ancestral substitutions cause shorter metaphase length and more chromosome segregation errors in human brain organoids, similar to what we find in chimpanzee organoids. These results imply that the fidelity of chromosome segregation during neocortex development improved in modern humans after their divergence from Neanderthals.

<https://www.science.org/doi/full/10.1126/sciadv.abn7702>

JOSEPH G. MINE et al with KATIE E. SLOCOMBE & RICHARD W. WRANGHAM – Vocal signals facilitate cooperative hunting in wild chimpanzees

Cooperation and communication likely coevolved in humans. However, the evolutionary roots of this interdependence remain unclear. We address this issue by investigating the role of vocal signals in facilitating a group cooperative behavior in an ape species: hunting in wild chimpanzees. First, we show that bark vocalizations produced before hunt initiation are reliable signals of behavioral motivation, with barkers being most likely to participate in the hunt. Next, we find that barks are associated with greater hunter recruitment and more effective hunting, with shorter latencies to hunting initiation and prey capture. Our results indicate that the coevolutionary relationship between vocal communication and group-level cooperation is not unique to humans in the ape lineage and is likely to have been present in our last common ancestor with chimpanzees.

<https://www.science.org/doi/full/10.1126/sciadv.abo5553>

Trends in Cognitive Sciences

PAPERS

JACOB A. MILLER & KEVIN S. WEINER – Unfolding the evolution of human cognition

Recent findings spanning fields, from braincases in paleoneurobiology to in vivo measurements in cognitive neuroscience, provide insights into the evolution of cognition. Here, we integrate these findings and propose that studying small, evolutionarily new cortical structures has significant implications for identifying new links between neuroanatomical substrates and human-specific aspects of cognition.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00139-5](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00139-5)

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