EAORC BULLETIN 928 – 28 March 2021

CONTENTS

NOTICES

PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, do 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, do let me know.
And if you have any other ideas for extending the "EAORC experience", please contact me.

ACADEMIA.EDU – Ardipithecus ramidus and the evolution of language and singing

HOMO – Journal of Comparative Human Biology 68:2, 101-121 (2017)

GARY CLARK & MACIEJ HENNEBERG – Ardipithecus ramidus and the evolution of language and singing: An early origin for hominin vocal capability

In this paper we analyse the possibility that the early hominin Ardipithecus ramidus had vocal capabilities far exceeding those of any extant non-human primate. We argue that erect posture combined with changes in craniofacial morphology, such as reduced facial and jaw length, not only provide evidence for increased levels of pro-sociality, but also increased vocal ability. Reduced length of the face and jaw, combined with a flexed cranial base, suggests the larynx in this species was situated deeper in the neck than in chimpanzees, a trait which may have facilitated increased vocal ability. We also provide evidence that Ar.ramidus, by virtue of its erect posture, possessed a degree of cervical lordosis significantly greater than chimpanzees. This is indicative of increased mobility of the larynx within the neck and hence increased capacity to modulate vocalisations. In the paleoanthropological literature, these changes in early hominin skull morphology have to date been analysed in terms of a shift in mating and social behaviour, with little consideration given to vocally mediated sociality. Similarly, in the literature on language evolution there is a distinct lacuna regarding links between craniofacial correlates of social and mating systems and vocal ability. These are surprising oversights given that pro-sociality and vocal capability require identical alterations to the common ancestral skull and skeletal configuration. We therefore propose a model which integrates data on whole organism morphogenesis with evidence for a potential early emergence of hominin socio-vocal adaptations. Consequently, we suggest vocal capability may have evolved much earlier than has been traditionally proposed. Instead of emerging in the Homo genus, we suggest the palaeoecological context of late Miocene and early Pliocene forests and woodlands facilitated the evolution of hominin socio-vocal capability. We also propose that paedomorphic morphogenesis of the skull via the process of self-domestication enabled increased levels of pro-social behaviour, as well as increased capacity for socially synchronous vocalisation to evolve at the base of the hominin clade.
https://www.academia.edu/32111664/Ardipithecus_ramidus_and_the_evolution_of_language_and_singing_An_early_origin_for_hominin_vocal_capability?email_work_card=view-paper

NEWS

BREAKING SCIENCE – Archaeologists May Have Found 'Original Stonehenge'

A research team led by University College London archaeologists has discovered a 5,000-year-old dismantled stone circle in west Wales, close to Stonehenge's bluestone quarries. The discovery, reported in a paper in the journal Antiquity, raises the possibility that a 900-year-old legend about Stonehenge being built from an earlier stone circle contains a grain of truth.
http://feedproxy.google.com/~r/BreakingScienceNews/~3/rAvKh4ijigs/waun-mawn-09484.html?utm_source=feedburner&utm_medium=email

BREAKING SCIENCE – Southeast Asians Carry DNA of 'Mysterious Southern Denisovans'

The hominin fossil record of Island Southeast Asia (ISEA) indicates that at least two super-archaic species, Homo luzonensis and Homo floresiensis, were present around the time anatomically modern humans arrived in the region 50,000-60,000 years ago.
http://feedproxy.google.com/~r/BreakingScienceNews/~3/dfDzrSLbih0/southeast-asians-denisovan-dna-09480.html?utm_source=feedburner&utm_medium=email

BREAKING SCIENCE – Oldowan and Acheulean Flaked Stone Technologies Older than Previously Thought

The Oldowan and the Acheulean — currently the two oldest, well-documented stone tool technologies known to archaeologists — are roughly 30,000 to 60,000 years older than current evidence suggests, according to a new modeling study. Early stone tool technologies, such as the Oldowan and Acheulean, allowed early human ancestors to access new food types.

http://feedproxy.google.com/~r/BreakingScienceNews/~3/V4Z7InSfsLw/oldowan-acheulean-flaked-stone-technologies-09489.html?utm_source=feedburner&utm_medium=email

NATURE BRIEFING – Bonobos adopt orphaned outsiders

Adoption is rare in the animal kingdom, but now researchers have witnessed bonobos taking care of orphaned infants from outside their own communities. Two females named Marie and Chio, who live in the Luo Scientific Reserve in the Democratic Republic of the Congo, took charge of infants who were unrelated to any female in their family group. Researchers sometimes attribute adoptions to females practicing maternal care or helping their kin and advancing their genes, but those ideas can't explain these new observations. Seeing caretaking for unrelated infants "blew me away", says ethologist Cat Hobaiter.
https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=b0ecda8036&e=1db4b9a19b

NATURE BRIEFING – The fight against fake-paper factories

Since last January, journals have retracted at least 370 papers that have been publicly linked to 'paper mills', an analysis by Nature has found, and many more retractions are expected. Physicians in China are a particular target customer for paper mills — companies that churn out fake scientific manuscripts to order — because of intense pressure to publish combined with long work hours. Much of this housecleaning has come about thanks to sleuths who have publicly flagged papers that share suspiciously similar features, such as western blots with identical-looking backgrounds. The effect of such trickery can be very serious, says molecular oncology researcher Jennifer Byrne, who points to suspected fake studies that link genes to particular cancers. "People die from cancer — it is not a game."
https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=efe5158a99&e=1db4b9a19b

NATURE BRIEFING – Oldest wooden relic reshapes history

The world's oldest wooden sculpture is even older than previously thought. A new study suggests that the 2.7-metre-tall Shigir Idol was carved more than 12,000 years ago from a tree that was already more than 150 years old. The relic was preserved in a peat bog in the Ural Mountains and is the world's only surviving Stone Age wood carving. Its complex iconography of geometric patterns and human faces suggests that the region's ancient societies were more sophisticated than previously thought. "The new Shigir evidence makes archaeologists daydream of how the archaeological record may have looked if wooden remains had been preserved in greater abundance," says archeologist Olaf Jöris.
https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=60168a6a0c&e=1db4b9a19b

SCIENCE DAILY – More than words: Using AI to map how the brain understands sentences

New research involving neuroimaging and A.I., describes the complex network within the brain that comprehends the meaning of a spoken sentence.
https://www.sciencedaily.com/releases/2021/03/210323150745.htm

SCIENCE DAILY – Babies prefer baby talk, whether they're learning one language or two

A study finds babies prefer baby talk, whether they're learning one language or two. Scientists knew infants learning one language preferred the sing-song tones of parents' baby talk, and now scientists have found babies learning two languages are developmentally right on track. Bilingual babies showed the same interest in baby talk, at the same age, as monolingual babies.
https://www.sciencedaily.com/releases/2021/03/210323103857.htm

SCIENCE DAILY – New evidence in search for the mysterious Denisovans

Researchers have conducted a comprehensive genetic analysis and found no evidence of interbreeding between modern humans and the ancient humans known from fossil records in Island Southeast Asia. They did find further DNA evidence of our mysterious ancient cousins, the Denisovans, which could mean there are major discoveries to come in the region.
https://www.sciencedaily.com/releases/2021/03/210323084732.htm

SCIENCE DAILY – New study finds false memories can be reversed

Rich false memories of autobiographical events can be planted - and then reversed, a new article has found.
https://www.sciencedaily.com/releases/2021/03/210324132307.htm

SCIENCE DAILY – How humans develop larger brains than other apes

A new study is the first to identify how human brains grow much larger, with three times as many neurons, compared with chimpanzee and gorilla brains. The study identified a key molecular switch that can make ape brain organoids grow more like human organoids, and vice versa.
https://www.sciencedaily.com/releases/2021/03/210324113502.htm

SCIENCE DAILY – Narcissism driven by insecurity, not grandiose sense of self

Narcissism is driven by insecurity, and not an inflated sense of self, finds a new study, which may also explain what motivates the self-focused nature of social media activity.
https://www.sciencedaily.com/releases/2021/03/210325150223.htm

SCIENCE DAILY – The world's earliest stone technologies are likely to be older than previously thought

A new study has found that Oldowan and Acheulean stone tool technologies are likely to be tens of thousands of years older than current evidence suggests.
https://www.sciencedaily.com/releases/2021/03/210324113413.htm

SCIENCE DAILY – Measurable changes in brain activity during first few months of studying a new language

A study with first-time learners of Japanese has measured how brain activity changes after just a few months of studying a new language. The results show that acquiring a new language initially boosts brain activity, which then reduces as language skills improve.
https://www.sciencedaily.com/releases/2021/03/210326104719.htm

SCIENCE DAILY – The brain area with which we interpret the world

Language, empathy, attention - as different as these abilities may be, one brain region is involved in all these processes: The inferior parietal lobe (IPL). Yet until now it was unclear exactly what role it plays in these profoundly human abilities. Scientists have now shown that the IPL comes into play when we need to interpret our environment.
https://www.sciencedaily.com/releases/2021/03/210326104714.htm

SCIENCE NEWS – Gorillas in the wild often adopt young orphaned apes

A few years ago, four female mountain gorillas left home, abandoning not only their mate—a sick alpha silverback—but their infants, which were barely old enough to feed themselves. They may have sensed that their offspring would be safer with their ailing father than with new males that often kill infants from other groups. Still, most mammals abandoned by their mothers risk an early death, and researchers worried about the young gorillas.
https://www.sciencemag.org/news/2021/03/gorillas-wild-often-adopt-young-orphaned-apes?utm_campaign=news_daily_2021-03-23&et_rid=17774313&et_cid=3710137

OTHER NEWS – GUARDIAN – Scientists discover why the human brain is so big

Molecular switch makes human organ three times larger than great apes', study finds.
https://www.theguardian.com/science/2021/mar/24/scientists-discover-why-the-human-brain-is-so-big?utm_term=14db93c6f535b73f3da284c3269aa92a&utm_campaign=GuardianTodayUK&utm_source=esp&utm_medium=Email&CMP=GTUK_email

PUBLICATIONS

American Journal of Physical Anthropology

PAPERS

ERIN MARIE WILLIAMS-HATALA et al – Kinetics of stone tool production among novice and expert tool makers

As is the case among many complex motor tasks that require prolonged practice before achieving expertise, aspects of the biomechanics of knapping vary according to the relative experience/skill level of the practitioner. In archaeological experiments focused on the production of Plio-Pleistocene stone tools, these skill-mediated biomechanical differences have bearings on experimental design, the interpretation of results, and lithic assemblage analysis. A robust body of work exists on variation in kinematic patterns across skill levels but less is known about potential kinetic differences. The current study was undertaken to better understand kinetic patterns observed across skill levels during "Oldowan," freehand stone tool production.

Manual pressure data were collected from 23 novice and 9 expert stone tool makers during the production of simple stone flakes using direct hard hammer percussion.

Results show that expert tool makers experienced significantly lower cumulative pressure magnitudes and pressure–time integral magnitudes compared with novices. In expert knappers, digits I and II experienced similarly high pressures (both peak pressure and pressure–time integrals) and low variability in pressure relative to digits III–V. Novices, in contrast, tended to hold hammerstones such that pressure patterns were similar across digits II–V, and they showed low variability on digit I only.

The similar and consistent emphasis of the thumb by both skill groups indicates the importance of this digit in stabilizing the hammerstone. The emphasis placed on digit II is exclusive to expert knappers, and so this digit may offer osteological signals diagnostic of habitual expert tool production.
https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24159?campaign=woletoc

EVAN A. SIMONS – Testing the Giles hypothesis using geometric morphometrics
The Giles hypothesis posits that differences in the cranial morphology of Pan troglodytes and Gorilla gorilla are largely the result of allometric scaling. However, previous support for the Giles hypothesis was based on bivariate plots of linear measurements. This investigation uses geometric morphometric methods to retest this hypothesis and its prediction that extending the ontogenetic trajectory of a chimpanzee would produce an adult gorilla-like cranial morphology.
Forty-three 3D cranial landmarks were collected from an ontogenetic series of 76 Pan troglodytes and 58 Gorilla gorilla specimens. Ontogenetic trajectories of cranial shape change were computed via multivariate regression of Procrustes aligned coordinates against LnCS (size vector) and molar eruption stage (developmental vector). These two vectors were then used in developmental simulations to extend the ontogenetic trajectories of adult chimpanzees. Allometric trajectories of chimpanzees and gorillas were also directly compared using Procrustes ANOVA.
Pan and Gorilla significantly differ in their allometric trajectories, and none of the Pan developmental simulations resembled actual adult gorillas. Additionally, the more the Pan developmental vector was extended, the more morphologically distinct the simulations became from actual adult gorillas.
https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24219?campaign=woletoc

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Biolinguistics

PAPERS

SŁAWOMIR WACEWICZ, PRZEMYSŁAW ŻYWICZYŃSKI, STEFAN HARTMANN, MICHAEL PLEYER & ANTONIO BENÍTEZ-BURRACO – Language in Language Evolution Research: In Defense of a Pluralistic View
Many controversies in language evolution research derive from the fact that language is itself a natural language word, which makes the underlying concept fuzzy and cumbersome, and a common perception is that progress in language evolution research is hindered because researchers do not 'talk about the same thing'. In this article, we claim that agreement on a single, top-down definition of language is not a sine qua non for good and productive research in the field of language evolution. First, we use the example of the notion FLN ('faculty of language in the narrow sense') to demonstrate how the specific wording of an important top-down definition of (the faculty of) language can—surprisingly—be inconsequential to actual research practice. We then review four approaches to language evolution that we estimate to be particularly influential in the last decade. We show how their breadth precludes a single common conceptualization of language but instead leads to a family resemblance pattern, which underwrites fruitful communication between these approaches, leading to cross-fertilisation and synergies.
https://www.biolinguistics.eu/index.php/biolinguistics/article/view/739

JOSÉ-LUIS MENDÍVIL-GIRÓ – In Defence of FLB/FLN: A Reply to Wacewicz et al. (2020)
"Language in language evolution research" (Wacewicz et al., 2020) is a valuable synthesis of recent research on the origin and evolution of language. Its central message, however, is surprising: instead of encouraging the clearest possible specification of the object of study in research on language evolution, that is, a specification of what evolves when we say that language evolved, the authors argue that the lack of agreement on what language is has served to facilitate the significant progress made in research on language evolution over the last decade. The absence of a more or less hegemonic theory of language (within and outside linguistics) may have made easier the proliferation of hypotheses, data sources, methodologies and opportunities for interdisciplinary collaboration in language evolution research. But, unless one wants to say that a certain definition of language can be an obstacle to the investigation of its evolution, it is difficult to justify the claim that things would have been worse, or progress less marked, had there been more agreement on the nature of the object of study. It is more logical to suppose that things might have gone even better, although it is impossible to know.
https://www.biolinguistics.eu/index.php/biolinguistics/article/view/812

Cell

PAPERS

SILVIA BENITO-KWIECINSKI et al – An early cell shape transition drives evolutionary expansion of the human forebrain
The human brain has undergone rapid expansion since humans diverged from other great apes, but the mechanism of this human-specific enlargement is still unknown. Here, we use cerebral organoids derived from human, gorilla, and chimpanzee cells to study developmental mechanisms driving evolutionary brain expansion. We find that neuroepithelial differentiation is a protracted process in apes, involving a previously unrecognized transition state characterized by a change in cell shape. Furthermore, we show that human organoids are larger due to a delay in this transition, associated with differences in interkinetic nuclear migration and cell cycle length. Comparative RNA sequencing (RNA-seq) reveals differences in expression dynamics of cell morphogenesis factors, including ZEB2, a known epithelial-mesenchymal transition regulator. We show that ZEB2 promotes neuroepithelial transition, and its manipulation and downstream signaling leads to acquisition of nonhuman ape architecture in the human context and vice versa, establishing an important role for neuroepithelial cell shape in human brain expansion.
https://www.cell.com/cell/fulltext/S0092-8674(21)00239-7

Current Biology

ARTICLES

TRACY L. KIVELL – Human evolution: Thumbs up for efficiency

Modelling a muscle key to flexing the thumb, a new study suggests that the powerful opposability that characterises the dextrous human hand evolved in some of our fossil relatives about two million years ago — a time when tool use became more important.

https://www.cell.com/current-biology/fulltext/S0960-9822(21)00228-1?dgcid=raven_jbs_etoc_email

PAPERS

FOTIOS ALEXANDROS KARAKOSTIS et al with KATERINA HARVATI – Biomechanics of the human thumb and the evolution of dexterity

Systematic tool production and use is one of humanity's defining characteristics, possibly originating as early as >3 million years ago. Although heightened manual dexterity is considered to be intrinsically intertwined with tool use and manufacture, and critical for human evolution, its role in the emergence of early culture remains unclear. Most previous research on this question exclusively relied on direct morphological comparisons between early hominin and modern human skeletal elements, assuming that the degree of a species' dexterity depends on its similarity with the modern human form. Here, we develop a new approach to investigate the efficiency of thumb opposition, a fundamental component of manual dexterity, in several species of fossil hominins. Our work for the first time takes into account soft tissue as well as bone anatomy, integrating virtual modeling of musculus opponens pollicis and its interaction with three-dimensional bone shape form. Results indicate that a fundamental aspect of efficient thumb opposition appeared approximately 2 million years ago, possibly associated with our own genus Homo, and did not characterize Australopithecus, the earliest proposed stone tool maker. This was true also of the late Australopithecus species, Australopithecus sediba, previously found to exhibit human-like thumb proportions. In contrast, later Homo species, including the small-brained Homo naledi, show high levels of thumb opposition dexterity, highlighting the increasing importance of cultural processes and manual dexterity in later human evolution.

https://www.cell.com/current-biology/fulltext/S0960-9822(20)31893-5?dgcid=raven_jbs_etoc_email

eLife

PAPERS

OLE NUMSSEN, DANILO BZDOK & GESA HARTWIGSEN – Functional specialization within the inferior parietal lobes across cognitive domains

The inferior parietal lobe (IPL) is a key neural substrate underlying diverse mental processes, from basic attention to language and social cognition, that define human interactions. Its putative domain-global role appears to tie into poorly understood differences between cognitive domains in both hemispheres. Across attentional, semantic, and social cognitive tasks, our study explored functional specialization within the IPL. The task specificity of IPL subregion activity was substantiated by distinct predictive signatures identified by multivariate pattern-learning algorithms. Moreover, the left and right IPL exerted domain-specific modulation of effective connectivity among their subregions. Task-evoked functional interactions of the anterior and posterior IPL subregions involved recruitment of distributed cortical partners. While anterior IPL subregions were engaged in strongly lateralized coupling links, both posterior subregions showed more symmetric coupling patterns across hemispheres. Our collective results shed light on how under-appreciated hemispheric specialization in the IPL supports some of the most distinctive human mental capacities.

https://elifesciences.org/articles/63591

DEREK EVAN NEE – Integrative frontal-parietal dynamics supporting cognitive control

Coordinating among the demands of the external environment and internal plans requires cognitive control supported by a fronto-parietal control network (FPCN). Evidence suggests that multiple control systems span the FPCN whose operations are poorly understood. Previously (Nee and D'Esposito, 2016; 2017), we detailed frontal dynamics that support control processing, but left open their role in broader cortical function. Here, I show that the FPCN consists of an external/present-oriented to internal/future-oriented cortical gradient extending outwardly from sensory-motor cortices. Areas at the ends of this gradient act in a segregative manner, exciting areas at the same level, but suppressing areas at different levels. By contrast, areas in the middle of the gradient excite areas at all levels, promoting integration of control processing. Individual differences in integrative dynamics predict higher level cognitive ability and amenability to neuromodulation. These data suggest that an intermediary zone within the FPCN underlies integrative processing that supports cognitive control.

https://elifesciences.org/articles/57244

Frontiers in Ecology and Evolution

PAPERS

ALEXANDER MIELKE et al with CATHERINE CROCKFORD & ROMAN M. WITTIG – Consistency of Social Interactions in Sooty Mangabeys and Chimpanzees

Predictability of social interactions can be an important measure for the social complexity of an animal group. Predictability is partially dependent on how consistent interaction patterns are over time: does the behavior on 1 day explain the behavior on another? We developed a consistency measure that serves two functions: detecting which interaction types in a dataset are so inconsistent that including them in further analyses risks introducing unexplained error; and comparatively quantifying differences in consistency within and between animal groups. We applied the consistency measure to simulated data and field data for one group of sooty mangabeys (Cercocebus atys atys) and to groups of Western chimpanzees (Pan troglodytes verus) in the Taï National Park, Côte d'Ivoire, to test its properties and compare consistency across groups. The consistency measures successfully identified interaction types whose low internal consistency would likely create analytical problems. Species-level differences in consistency were less pronounced than differences within groups: in all groups, aggression and dominance interactions were the most consistent, followed by grooming; spatial proximity at different levels was much less consistent than directed interactions. Our consistency measure can facilitate decision making of researchers wondering whether to include interaction types in their analyses or social networks and allows us to compare interaction types within and between species regarding their predictability.
https://www.frontiersin.org/articles/10.3389/fevo.2020.603677/full?utm_source=F-AAE&utm_medium=EMLF&utm_campaign=MRK_1585058_6_Ecolog_20210325_arts_A

Mind & Language

PAPERS

MATTHIAS MICHEL & ADRIEN DOERIG – A new empirical challenge for local theories of consciousness

Local theories of consciousness state that one is conscious of a feature if it is adequately represented and processed in sensory brain areas, given some background conditions. We challenge the core prediction of local theories based on long-lasting postdictive effects demonstrating that features can be represented for hundreds of milliseconds in perceptual areas without being consciously perceived. Unlike previous empirical data aimed against local theories, localists cannot explain these effects away by conjecturing that subjects are phenomenally conscious of features that they cannot report. We also discuss alternative explanations that localists could offer.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12319?campaign=wolearlyview

UWE PETERS – Objectivity, perceptual constancy, and teleology in young children

Can young children such as 3-year-olds represent the world objectively? Some prominent developmental psychologists—such as Perner and Tomasello—assume so. I argue that this view is susceptible to a prima facie powerful objection: To represent objectively, one must be able to represent not only features of the entities represented but also features of objectification itself, which 3-year-olds cannot do yet. Drawing on Burge's work on perceptual constancy, I provide a response to this objection and motivate a distinction between three different kinds of objectivity. This distinction helps advance current research on both objectivity and teleological action explanations in young children.
https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12344?campaign=wolearlyview

THOMAS BLANCHARD, DYLAN MURRAY & TANIA LOMBROZO – Experiments on causal exclusion

Intuitions play an important role in the debate on the causal status of high-level properties. For instance, Kim has claimed that his “exclusion argument” relies on “a perfectly intuitive … understanding of the causal relation.” We report the results of three experiments examining whether laypeople really have the relevant intuitions. We find little support for Kim's view and the principles on which it relies. Instead, we find that laypeople are willing to count both a multiply realized property and its realizers as causes, and regard the systematic overdetermination implied by this view as unproblematic.
https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12343?campaign=wolearlyview

Nature

PAPERS

DIOGO PEIXOTO et al – Decoding and perturbing decision states in real time

In dynamic environments, subjects often integrate multiple samples of a signal and combine them to reach a categorical judgment. The process of deliberation can be described by a time-varying decision variable (DV), decoded from neural population activity, that predicts a subject’s upcoming decision. Within single trials, however, there are large moment-to-moment fluctuations in the DV, the behavioural significance of which is unclear. Here, using real-time, neural feedback control of stimulus duration, we show that within-trial DV fluctuations, decoded from motor cortex, are tightly linked to decision state in macaques, predicting behavioural choices substantially better than the condition-averaged DV or the visual stimulus alone. Furthermore, robust changes in DV sign have the statistical regularities expected from behavioural studies of changes of mind. Probing the decision process on single trials with weak stimulus pulses, we find evidence for time-varying absorbing decision bounds, enabling us to distinguish between specific models of decision making.

https://www.nature.com/articles/s41586-020-03181-9

MOHSEN JAMALI et al – Single-neuronal predictions of others' beliefs in humans

Human social behaviour crucially depends on our ability to reason about others. This capacity for theory of mind has a vital role in social cognition because it enables us not only to form a detailed understanding of the hidden thoughts and beliefs of other individuals but also to understand that they may differ from our own. Although a number of areas in the human brain have been linked to social reasoning and its disruption across a variety of psychosocial disorders, the basic cellular mechanisms that underlie human theory of mind remain undefined. Here, using recordings from single cells in the human dorsomedial prefrontal cortex, we identify neurons that reliably encode information about others' beliefs across richly varying scenarios and that distinguish self- from other-belief-related representations. By further following their encoding dynamics, we show how these cells represent the contents of the others' beliefs and accurately predict whether they are true or false. We also show how they track inferred beliefs from another's specific perspective and how their activities relate to behavioural performance. Together, these findings reveal a detailed cellular process in the human dorsomedial prefrontal cortex for representing another's beliefs and identify candidate neurons that could support theory of mind.
https://www.nature.com/articles/s41586-021-03184-0

Nature Ecology & Evolution

PAPERS

BARBARA FISCHER et al – Sex differences in the pelvis did not evolve de novo in modern humans

It is commonly assumed that the strong sexual dimorphism of the human pelvis evolved for delivering the relatively large human foetuses. Here we compare pelvic sex differences across modern humans and chimpanzees using a comprehensive geometric morphometric approach. Even though the magnitude of sex differences in pelvis shape was two times larger in humans than in chimpanzees, we found that the pattern is almost identical in the two species. We conclude that this pattern of pelvic sex differences did not evolve de novo in modern humans and must have been present in the common ancestor of humans and chimpanzees, and thus also in the extinct Homo species. We further suggest that this shared pattern was already present in early mammals and propose a hypothesis of facilitated variation as an explanation: the conserved mammalian endocrine system strongly constrains the evolution of the pattern of pelvic differences but enables rapid evolutionary change of the magnitude of sexual dimorphism, which in turn facilitated the rapid increase in hominin brain size.
https://www.nature.com/articles/s41559-021-01425-z

JOÃO C. TEIXEIRA et al with CHRIS STRINGER – Widespread Denisovan ancestry in Island Southeast Asia but no evidence of substantial super-archaic hominin admixture

The hominin fossil record of Island Southeast Asia (ISEA) indicates that at least two endemic 'super-archaic' species—Homo luzonensis and H. floresiensis—were present around the time anatomically modern humans arrived in the region >50,000 years ago. Intriguingly, contemporary human populations across ISEA carry distinct genomic traces of ancient interbreeding events with Denisovans—a separate hominin lineage that currently lacks a fossil record in ISEA. To query this apparent disparity between fossil and genetic evidence, we performed a comprehensive search for super-archaic introgression in >400 modern human genomes, including >200 from ISEA. Our results corroborate widespread Denisovan ancestry in ISEA populations, but fail to detect any substantial super-archaic admixture signals compatible with the endemic fossil record of ISEA. We discuss the implications of our findings for the understanding of hominin history in ISEA, including future research directions that might help to unlock more details about the prehistory of the enigmatic Denisovans.
https://www.nature.com/articles/s41559-021-01408-0

Nature European Journal of Human Genetics

PAPERS

MUTHUKRISHNAN EAASWARKHANTH et al – Unraveling a fine-scale high genetic heterogeneity and recent continental connections of an Arabian Peninsula population

Recent studies have showed the diverse genetic architecture of the highly consanguineous populations inhabiting the Arabian Peninsula. Consanguinity coupled with heterogeneity is complex and makes it difficult to understand the bases of population-specific genetic diseases in the region. Therefore, comprehensive genetic characterization of the populations at the finest scale is warranted. Here, we revisit the genetic structure of the Kuwait population by analyzing genome-wide single nucleotide polymorphisms data from 583 Kuwaiti individuals sorted into three subgroups. We envisage a diverse demographic genetic history among the three subgroups based on drift and allelic sharing with modern and ancient individuals. Furthermore, our comprehensive haplotype-based analyses disclose a high genetic heterogeneity among the Kuwaiti populations. We infer the major sources of ancestry within the newly defined groups; one with an obvious predominance of sub-Saharan/Western Africa mostly comprising Kuwait-B individuals, and other with West Eurasia including Kuwait-P and Kuwait-S individuals. Overall, our results recapitulate the historical population movements and reaffirm the genetic imprints of the legacy of continental trading in the region. Such deciphering of fine-scale population structure and

their regional genetic heterogeneity would provide clues to the uncharted areas of disease-gene discovery and related associations in populations inhabiting the Arabian Peninsula.
https://www.nature.com/articles/s41431-021-00861-6

Nature Human Behaviour

NEWS

Australian Pleistocene rock art

Obtaining accurate dates for rock art is important to both archaeologists and Aboriginal Traditional Owners, but a lack of organic material associated with rock art can make this challenging. Using radiocarbon dating of mud wasp nests, Finch et al. show that naturalistic depictions of animals in the Kimberley region of northern Australia date to between 13,000 and 17,000 years ago.
https://www.nature.com/articles/s41562-020-01043-y

PAPERS

DAMIEN FINCH et al – Ages for Australia's oldest rock paintings

Naturalistic depictions of animals are a common subject for the world's oldest dated rock art, including wild bovids in Indonesia and lions in France's Chauvet Cave. The oldest known Australian Aboriginal figurative rock paintings also commonly depict naturalistic animals but, until now, quantitative dating was lacking. Here, we present 27 radiocarbon dates on mud wasp nests that constrain the ages of 16 motifs from this earliest known phase of rock painting in the Australian Kimberley region. These initial results suggest that paintings in this style proliferated between 17,000 and 13,000 years ago. Notably, one painting of a kangaroo is securely dated to between 17,500 and 17,100 years on the basis of the ages of three overlying and three underlying wasp nests. This is the oldest radiometrically dated in situ rock painting so far reported in Australia.
https://www.nature.com/articles/s41562-020-01041-0

JULIA MARSHALL, DANIEL A. YUDKIN & MOLLY J. CROCKETT – Children punish third parties to satisfy both consequentialist and retributive motives

Adults punish moral transgressions to satisfy both retributive motives (such as wanting antisocial others to receive their 'just deserts') and consequentialist motives (such as teaching transgressors that their behaviour is inappropriate). Here, we investigated whether retributive and consequentialist motives for punishment are present in children approximately between the ages of five and seven. In two preregistered studies (N = 251), children were given the opportunity to punish a transgressor at a cost to themselves. Punishment either exclusively satisfied retributive motives by only inflicting harm on the transgressor, or additionally satisfied consequentialist motives by teaching the transgressor a lesson. We found that children punished when doing so satisfied only retributive motives, and punished considerably more when doing so also satisfied consequentialist motives. Together, these findings provide evidence for the presence of both retributive and consequentialist motives in young children.
https://www.nature.com/articles/s41562-020-00975-9

Nature Scientific Reports

PAPERS

JUAN LI, YI LIU, ZHEN WANG & HAOXIANG XIA – Egoistic punishment outcompetes altruistic punishment in the spatial public goods game

The evolution of costly punishment is a puzzle due to cooperators' second-order free-riding. Previous studies have proposed many solutions mainly focused on reducing the punishment cost or punishing second-order free riders directly or indirectly. We attempt to explain this confusion from the perspective of punishment motivation, which is why the punisher is willing to pay the cost. The answer is that the punisher is egoistic. Egoistic punishment aims to protect punishers' own cooperative benefits shared by the defectors. In such case, egoistic punishers would pay a cost in punishing defectors and retrieve lost payoffs from defectors. Here, we examined the evolution and performance of egoistic punishment and compared it with typical altruistic punishment using classic peer-punishment and pool-punishment modes. Results showed egoistic punishment can evolve and effectively promote cooperation within a large parameter range, whether in a well-mixed or structured population, or through peer-punishment or pool-punishment modes. This result is also robust to different strategy-updating rules. The evolution under the pool-punishment mechanism is more complicated. The influence of parameters is counter-intuitive because of cycle dominance; namely, the cost is the key factor to control the level of cooperation and the fine determines the ratio of the punishers and cooperators. Compared with altruistic punishment, egoistic punishment can promote cooperation in a lower-fine and higher-cost area, especially in the pool punishment mode, and the egoistic punishers have stronger survivability. Egoistic punishers represent the natural fairness in a social system. Results revealed that focusing on individual equity can significantly promote collective cooperation. This study provides another explanation for the evolution of costly punishment.
https://www.nature.com/articles/s41598-021-85814-1

New Scientist

NEWS

Horses may recognise themselves in a mirror, hinting at self-awareness

Horses seem to recognise themselves in mirrors, and they may even use the information in their reflection to recognise if their face is dirty and needs wiping clean. Eleven horses out of a group of 14 tried to rub coloured marks off their own cheeks after they discovered them in a mirror. This makes horses the only animals besides primates found to be generally capable of self-recognition in a mirror, says Paolo Baragli at the University of Pisa in Italy.
https://www.newscientist.com/article/2271945-horses-may-recognise-themselves-in-a-mirror-hinting-at-self-awareness/#ixzz6qA374dd2

REVIEWS

TOM HIGHAM – The World Before Us review: A gripping account of Earth's other humans

Review of 'The World Before Us: How science is revealing a new story of our human origins' by Tom Higham.
https://www.newscientist.com/article/mg24933270-400-the-world-before-us-review-a-gripping-account-of-earths-other-humans/#ixzz6qA3rAxYX

Philosophical Transactions of the Royal Society B

PAPERS

SØREN WICHMANN & TARAKA RAMA – Testing methods of linguistic homeland detection using synthetic data

Two families of quantitative methods have been used to infer geographical homelands of language families: Bayesian phylogeography and the 'diversity method'. Bayesian methods model how populations may have moved using a phylogenetic tree as a backbone, while the diversity method assumes that the geographical area where linguistic diversity is highest likely corresponds to the homeland. No systematic tests of the performances of the different methods in a linguistic context have so far been published. Here, we carry out performance testing by simulating language families, including branching structures and word lists, along with speaker populations moving in space. We test six different methods: two versions of BayesTraits; the relaxed random walk model of BEAST 2; our own RevBayes implementations of a fixed rate and a variable rates random walk model; and the diversity method. As a result of the tests, we propose a hierarchy of performance of the different methods. Factors such as geographical idiosyncrasies, incomplete sampling, tree imbalance and small family sizes all have a negative impact on performance, but mostly across the board, the performance hierarchy generally being impervious to such factors.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0202

CHRISTINE SCHREYER & DAVID ADGER – Comparing prehistoric constructed languages: world-building and its role in understanding prehistoric languages

In this paper, we compare the languages each of the authors invented as prehistoric languages for popular culture media. Schreyer's language, Beama, was created for the film Alpha (2018), while Adger's language, Tan!aa Kawawa ki, was created for a television series on how early hominins spread throughout the world (the series was green-lit but then cancelled). We argue that though this creative process may seem far removed from classical research paradigms on language evolution, it can provide some insight into how disparate research on the possible properties of prehistoric languages can be brought together to illustrate how these languages might have worked as whole linguistic systems within these imagined worlds, as well as in prehistory.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0201

STEFAN HARTMANN & MICHAEL PLEYER – Constructing a protolanguage: reconstructing prehistoric languages in a usage-based construction grammar framework

Construction grammar is an approach to language that posits that units and structures in language can be exhaustively described as pairings between form and meaning. These pairings are called constructions and can have different degrees of abstraction, i.e. they span the entire range from very concrete (armadillo, avocado) to very abstract constructions such as the ditransitive construction (I gave her a book). This approach has been applied to a wide variety of different areas of research in linguistics, such as how new constructions emerge and change historically. It has also been applied to investigate the evolutionary emergence of modern fully fledged language, i.e. the question of how systems of constructions can arise out of prelinguistic communication. In this paper, we review the contribution of usage-based construction grammar approaches to language change and language evolution to the questions of (i) the structure and nature of prehistoric languages and (ii) how constructions in prehistoric languages emerged out of non-linguistic or protolinguistic communication. In particular, we discuss the possibilities of using constructions as the main unit of analysis both in reconstructing predecessors of existing languages (protolanguages) and in formulating theories of how a potential predecessor of human language in general (protolanguage) must have looked like.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0200

ANDREA CEOLIN et al – At the boundaries of syntactic prehistory
Can language relatedness be established without cognate words? This question has remained unresolved since the nineteenth century, leaving language prehistory beyond etymologically established families largely undefined. We address this problem through a theory of universal syntactic characters. We show that not only does syntax allow for comparison across distinct traditional language families, but that the probability of deeper historical relatedness between such families can be statistically tested through a dedicated algorithm which implements the concept of 'possible languages' suggested by a formal syntactic theory. Controversial clusters such as e.g. Altaic and Uralo-Altaic are significantly supported by our test, while other possible macro-groupings, e.g. Indo-Uralic or Basque-(Northeast) Caucasian, prove to be indistinguishable from a randomly generated distribution of language distances. These results suggest that syntactic diversity, modelled through a generative biolinguistic framework, can be used to provide a proof of historical relationship between different families irrespectively of the presence of a common lexicon from which regular sound correspondences can be determined; therefore, we argue that syntax may expand the time limits imposed by the classical comparative method.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0197

PRZEMYSŁAW ŻYWICZYŃSKI, SŁAWOMIR WACEWICZ & CASEY LISTER – Pantomimic fossils in modern human communication
Bodily mimesis, the capacity to use the body representationally, was one of the key innovations that allowed early humans to go beyond the 'baseline' of generalized ape communication and cognition. We argue that the original human-specific communication afforded by bodily mimesis was based on signs that involve three entities: an expression that represents an object (i.e. communicated content) for an interpreter. We further propose that the core component of this communication, pantomime, was able to transmit referential information that was not limited to select semantic domains or the 'here-and-now', by means of motivated—most importantly iconic—signs. Pressures for expressivity and economy then led to conventionalization of signs and a growth of linguistic characteristics: semiotic systematicity and combinatorial expression. Despite these developments, both naturalistic and experimental data suggest that the system of pantomime did not disappear and is actively used by modern humans. Its contemporary manifestations, or pantomimic fossils, emerge when language cannot be used, for instance when people do not share a common language, or in situations where the use of (spoken) language is difficult, impossible or forbidden. Under such circumstances, people bootstrap communication by means of pantomime and, when these circumstances persist, newly emergent pantomimic communication becomes increasingly language-like.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2020.0204

FRANCESCO FERRETTI & INES ADORNETTI – Persuasive conversation as a new form of communication in Homo sapiens
The aim of this paper is twofold: to propose that conversation is the distinctive feature of Homo sapiens' communication; and to show that the emergence of modern language is tied to the transition from pantomime to verbal and grammatically complex forms of narrative. It is suggested that (animal and human) communication is a form of persuasion and that storytelling was the best tool developed by humans to convince others. In the early stage of communication, archaic hominins used forms of pantomimic storytelling to persuade others. Although pantomime is a powerful tool for persuasive communication, it is proposed that it is not an effective tool for persuasive conversation: conversation is characterized by a form of reciprocal persuasion among peers; instead, pantomime has a mainly asymmetrical character. The selective pressure towards persuasive reciprocity of the conversational level is the evolutionary reason that allowed the transition from pantomime to grammatically complex codes in H. sapiens, which favoured the evolution of speech.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0196

DAVID GIL & YESHAYAHU SHEN – Metaphors: the evolutionary journey from bidirectionality to unidirectionality
Metaphors, a ubiquitous feature of human language, reflect mappings from one conceptual domain onto another. Although founded on bidirectional relations of similarity, their linguistic expression is typically unidirectional, governed by conceptual hierarchies pertaining to abstractness, animacy and prototypicality. The unidirectional nature of metaphors is a product of various asymmetries characteristic of grammatical structure, in particular, those related to thematic role assignment. This paper argues that contemporary metaphor unidirectionality is the outcome of an evolutionary journey whose origin lies in an earlier bidirectionality. Invoking the Complexity Covariance Hypothesis governing the correlation of linguistic and socio-political complexity, the Evolutionary Inference Principle suggests that simpler linguistic structures are evolutionarily prior to more complex ones, and accordingly that bidirectional metaphors evolved at an earlier stage than unidirectional ones. This paper presents the results of an experiment comparing the degree of metaphor unidirectionality in two languages: Hebrew and Abui (spoken by some 16 000 people on the island of Alor in Indonesia). The results of the experiment show that metaphor unidirectionality is significantly higher in Hebrew than in Abui. Whereas Hebrew is a national language, Abui is a regional language of relatively low socio-political complexity. In accordance with the Evolutionary Inference Principle, the lower degree of metaphor unidirectionality of Abui may accordingly be reconstructed to an earlier stage in the evolution of language. The evolutionary journey from bidirectionality to unidirectionality in metaphors argued for here may be viewed as part of a larger package, whereby the development of grammatical complexity in various domains is driven by the incremental increases in socio-political complexity that characterize the course of human prehistory.

https://royalsocietypublishing.org/doi/full/10.1098/rstb.2020.0193

CHRIS CODE – The prehistory of speech and language is revealed in brain damage

The aim of this paper is to develop further the idea that symptoms that emerge in speech and language processing following brain damage can make a contribution to discussions of the early evolution of language. These diverse impairments are called aphasia, and this paper proposes that the recovery of a non-fluent aphasia syndrome following stroke could provide insights into the course of the pre-history of human language evolution. The observable symptoms emerge during recovery, crucially enabled by (dis)inhibition in parallel with a range of impairments in action processing (apraxias), including apraxia of speech. They are underpinned by changes in cortical and subcortical status following brain damage. It is proposed that the observed recovery mimics ontogenic and phylogenic processes in human speech and language. The arguments put forward provide insights tending to support the motor-gestural model of speech and language evolution.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0191

ANTONIO BENÍTEZ-BURRACO & LJILJANA PROGOVAC – Language evolution: examining the link between cross-modality and aggression through the lens of disorders

We demonstrate how two linguistic phenomena, figurative language (implicating cross-modality) and derogatory language (implicating aggression), both demand a precise degree of (dis)inhibition in the same cortico-subcortical brain circuits, in particular cortico-striatal networks, whose connectivity has been significantly enhanced in recent evolution. We examine four cognitive disorders/conditions that exhibit abnormal patterns of (dis)inhibition in these networks: schizophrenia (SZ), autism spectrum disorder (ASD), synaesthesia and Tourette's syndrome (TS), with the goal of understanding why the two phenomena altered reactive aggression and altered cross-modality cluster together in these disorders. Our proposal is that enhanced cross-modality (necessary to support language, in particular metaphoricity) was a result, partly a side-effect, of self-domestication (SD). SD targeted the taming of reactive aggression, but reactive impulses are controlled by the same cortico-subcortical networks that are implicated in cross-modality. We further add that this biological process of SD did not act alone, but was engaged in an intense feedback loop with the cultural emergence of early forms of language/grammar, whose high degree of raw metaphoricity and verbal aggression also contributed to increased brain connectivity and cortical control. Consequently, in conjunction with linguistic expressions serving as approximations/'fossils' of the earliest stages of language, these cognitive disorders/conditions serve as confident proxies of brain changes in language evolution, helping us reconstruct certain crucial aspects of early prehistoric languages and cognition, as well as shed new light on the nature of the disorders.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0188

ANDREEA S. CALUDE – The history of number words in the world's languages—what have we learnt so far?

For over 100 years, researchers from various disciplines have been enthralled and occupied by the study of number words. This article discusses implications for the study of deep history and human evolution that arise from this body of work. Phylogenetic modelling shows that low-limit number words are preserved across thousands of years, a pattern consistently observed in several language families. Cross-linguistic frequencies of use and experimental studies also point to widespread homogeneity in the use of number words. Yet linguistic typology and field documentation reports caution against positing a privileged linguistic category for number words, showing a wealth of variation in how number words are encoded across the world. In contrast with low-limit numbers, the higher numbers are characterized by a rapid and morphologically consistent pattern of expansion, and behave like grammatical phrasal units, following language-internal rules. Taken together, the evidence suggests that numbers are at the cross-roads of language history. For languages that do have productive and consistent number systems, numerals one to five are among the most reliable available linguistic fossils of deep history, defying change yet still bearing the marks of the past, while higher numbers emerge as innovative tools looking to the future, derived using language-internal patterns and created to meet the needs of modern speakers.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0206

DAVID GIL – Tense–aspect–mood marking, language-family size and the evolution of predication

This paper proposes a Complexity Covariance Hypothesis, whereby linguistic complexity covaries with cultural and socio-political complexity, and argues for an Evolutionary Inference Principle, in accordance with which, in domains where linguistic complexity correlates positively with cultural/socio-political complexity, simpler linguistic structures are evolutionarily prior to their more complex counterparts. Applying this methodology in a case study, the covariance of linguistic and cultural/socio-political complexity is examined by means of a cross-linguistic survey of tense–aspect–mood (TAM) marking in a worldwide sample of 868 languages. A novel empirical finding emerges: all else being equal, languages from small language families tend to have optional TAM marking, while languages from large language families are more likely to exhibit obligatory TAM marking. Since optional TAM marking is simpler than obligatory TAM marking, it can, therefore, be inferred that optional TAM marking is evolutionarily prior to obligatory TAM marking: a living fossil. In conclusion, it is argued that the presence of obligatory TAM marking, correlated with the more highly grammaticalized expression of thematic-role assignment, is a reflection of a deeper property of grammatical organization, namely, the grammaticalization of predication. Thus, it is suggested that the development of agriculture and resulting demographic expansions, resulting in the emergence of large language families, are a driving force in the evolution of predication in human language.

https://royalsocietypublishing.org/doi/full/10.1098/rstb.2020.0194

STEVEN MORAN, NICHOLAS A. LESTER & EITAN GROSSMAN – Inferring recent evolutionary changes in speech sounds
In this paper, we investigate evolutionarily recent changes in the distributions of speech sounds in the world's languages. In particular, we explore the impact of language contact in the past two millennia on today's distributions. Based on three extensive databases of phonological inventories, we analyse the discrepancies between the distribution of speech sounds of ancient and reconstructed languages, on the one hand, and those in present-day languages, on the other. Furthermore, we analyse the degree to which the diffusion of speech sounds via language contact played a role in these discrepancies. We find evidence for substantive differences between ancient and present-day distributions, as well as for the important role of language contact in shaping these distributions over time. Moreover, our findings suggest that the distributions of speech sounds across geographic macro-areas were homogenized to an observable extent in recent millennia. Our findings suggest that what we call the Implicit Uniformitarian Hypothesis, at least with respect to the composition of phonological inventories, cannot be held uncritically. Linguists who would like to draw inferences about human language based on present-day cross-linguistic distributions must consider their theories in light of even short-term language evolution.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0198

RICARDO ETXEPARE & ARITZ IRURTZUN – Gravettian hand stencils as sign language formatives
Several Upper Palaeolithic archaeological sites from the Gravettian period display hand stencils with missing fingers. On the basis of the stencils that Leroi-Gourhan identified in the cave of Gargas (France) in the late 1960s, we explore the hypothesis that those stencils represent hand signs with deliberate folding of fingers, intentionally projected as a negative figure onto the wall. Through a study of the biomechanics of handshapes, we analyse the articulatory effort required for producing the handshapes under the stencils in the Gargas cave, and show that only handshapes that are articulable in the air can be found among the existing stencils. In other words, handshape configurations that would have required using the cave wall as a support for the fingers are not attested. We argue that the stencils correspond to the type of handshape that one ordinarily finds in sign language phonology. More concretely, we claim that they correspond to signs of an 'alternate' or 'non-primary' sign language, like those still employed by a number of bimodal (speaking and signing) human groups in hunter–gatherer populations, like the Australian first nations or the Plains Indians. In those groups, signing is used for hunting and for a rich array of ritual purposes, including mourning and traditional story-telling. We discuss further evidence, based on typological generalizations about the phonology of non-primary sign languages and comparative ethnographic work, that points to such a parallelism. This evidence includes the fact that for some of those groups, stencil and petroglyph art has independently been linked to their sign language expressions.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0205

CALEB EVERETT – The sounds of prehistoric speech
Evidence is reviewed for widespread phonological and phonetic tendencies in contemporary languages. The evidence is based largely on the frequency of sound types in word lists and in phoneme inventories across the world's languages. The data reviewed point to likely tendencies in the languages of the Upper Palaeolithic. These tendencies include the reliance on specific nasal and voiceless stop consonants, the relative dispreference for posterior voiced consonants and the use of peripheral vowels. More tenuous hypotheses related to prehistoric languages are also reviewed. These include the propositions that such languages lacked labiodental consonants and relied more heavily on vowels, when contrasted to many contemporary languages. Such hypotheses suggest speech has adapted to subtle pressures that may in some cases vary across populations.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0195

JOHANNES DELLERT et al – Preferred sound groups of vocal iconicity reflect evolutionary mechanisms of sound stability and first language acquisition: evidence from Eurasia
In speech, the connection between sounds and word meanings is mostly arbitrary. However, among basic concepts of the vocabulary, several words can be shown to exhibit some degree of form–meaning resemblance, a feature labelled vocal iconicity. Vocal iconicity plays a role in first language acquisition and was likely prominent also in pre-historic language. However, an unsolved question is how vocal iconicity survives sound evolution, which is assumed to be inevitable and 'blind' to the meaning of words. We analyse the evolution of sound groups on 1016 basic vocabulary concepts in 107 Eurasian languages, building on automated homologue clustering and sound sequence alignment to infer relative stability of sound groups over time. We correlate this result with the occurrence of sound groups in iconic vocabulary, measured on a cross-linguistic dataset of 344 concepts across single-language samples from 245 families. We find that the sound stability of the Eurasian set correlates with iconic occurrence in the global set. Further, we find that sound stability and iconic occurrence of consonants are connected to acquisition order in the first language, indicating that children acquiring language play a role in maintaining vocal iconicity over time.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2020.0190

DAN DEDIU et al – The vocal tract as a time machine: inferences about past speech and language from the anatomy of the speech organs

While speech and language do not fossilize, they still leave traces that can be extracted and interpreted. Here, we suggest that the shape of the hard structures of the vocal tract may also allow inferences about the speech of long-gone humans. These build on recent experimental and modelling studies, showing that there is extensive variation between individuals in the precise shape of the vocal tract, and that this variation affects speech and language. In particular, we show that detailed anatomical information concerning two components of the vocal tract (the lower jaw and the hard palate) can be extracted and digitized from the osteological remains of three historical populations from The Netherlands, and can be used to conduct three-dimensional biomechanical simulations of vowel production. We could recover the signatures of inter-individual variation between these vowels, in acoustics and articulation. While 'proof-of-concept', this study suggests that older and less well-preserved remains could be used to draw inferences about historic and prehistoric languages. Moreover, it forces us to clarify the meaning and use of the uniformitarian principle in linguistics, and to consider the wider context of language use, including the anatomy, physiology and cognition of the speakers.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2020.0192

PNAS

PAPERS

THIBAUT DEVIÈSE et al – Reevaluating the timing of Neanderthal disappearance in Northwest Europe

Elucidating when Neanderthal populations disappeared from Eurasia is a key question in paleoanthropology, and Belgium is one of the key regions for studying the Middle to Upper Paleolithic transition. Previous radiocarbon dating placed the Spy Neanderthals among the latest surviving Neanderthals in Northwest Europe with reported dates as young as 23,880 ± 240 B.P. (OxA-8912). Questions were raised, however, regarding the reliability of these dates. Soil contamination and carbon-based conservation products are known to cause problems during the radiocarbon dating of bulk collagen samples. Employing a compound-specific approach that is today the most efficient in removing contamination and ancient genomic analysis, we demonstrate here that previous dates produced on Neanderthal specimens from Spy were inaccurately young by up to 10,000 y due to the presence of unremoved contamination. Our compound-specific radiocarbon dates on the Neanderthals from Spy and those from Engis and Fonds-de-Forêt demonstrate that they disappeared from Northwest Europe at 44,200 to 40,600 cal B.P. (at 95.4% probability), much earlier than previously suggested. Our data contribute significantly to refining models for Neanderthal disappearance in Europe and, more broadly, show that chronometric models regarding the appearance or disappearance of animal or hominin groups should be based only on radiocarbon dates obtained using robust pretreatment methods.
https://www.pnas.org/content/118/12/e2022466118.abstract?etoc

CAMERON T. ELLIS et al – Attention recruits frontal cortex in human infants

Young infants learn about the world by overtly shifting their attention to perceptually salient events. In adults, attention recruits several brain regions spanning the frontal and parietal lobes. However, it is unclear whether these regions are sufficiently mature in infancy to support attention and, more generally, how infant attention is supported by the brain. We used event-related functional magnetic resonance imaging (fMRI) in 24 sessions from 20 awake behaving infants 3 mo to 12 mo old while they performed a child-friendly attentional cuing task. A target was presented to either the left or right of the infant's fixation, and offline gaze coding was used to measure the latency with which they saccaded to the target. To manipulate attention, a brief cue was presented before the target in three conditions: on the same side as the upcoming target (valid), on the other side (invalid), or on both sides (neutral). All infants were faster to look at the target on valid versus invalid trials, with valid faster than neutral and invalid slower than neutral, indicating that the cues effectively captured attention. We then compared the fMRI activity evoked by these trial types. Regions of adult attention networks activated more strongly for invalid than valid trials, particularly frontal regions. Neither behavioral nor neural effects varied by infant age within the first year, suggesting that these regions may function early in development to support the orienting of attention. Together, this furthers our mechanistic understanding of how the infant brain controls the allocation of attention.
https://www.pnas.org/content/118/12/e2021474118.abstract?etoc

KRIS H. SABBI et al with RICHARD W. WRANGHAM – Sex differences in early experience and the development of aggression in wild chimpanzees

Sex differences in physical aggression occur across human cultures and are thought to be influenced by active sex role reinforcement. However, sex differences in aggression also exist in our close evolutionary relatives, chimpanzees, who do not engage in active teaching, but do exhibit long juvenile periods and complex social systems that allow differential experience to shape behavior. Here we ask whether early life exposure to aggression is sexually dimorphic in wild chimpanzees and, if so, whether other aspects of early sociality contribute to this difference. Using 13 y of all-occurrence aggression data collected from the Kanyawara community of chimpanzees (2005 to 2017), we determined that young male chimpanzees were victims of aggression more often than females by between 4 and 5 (i.e., early in juvenility). Combining long-term aggression data with data from a targeted study of social development (2015 to 2017), we found that two potential risk factors for aggression—time spent near adult males and time spent away from mothers—did not differ between young males and females. Instead, the major risk factor for receiving aggression was the amount of aggression that young chimpanzees

displayed, which was higher for males than females throughout the juvenile period. In multivariate models, sex did not mediate this relationship, suggesting that other chimpanzees did not target young males specifically, but instead responded to individual behavior that differed by sex. Thus, social experience differed by sex even in the absence of explicit gender socialization, but experiential differences were shaped by early-emerging sex differences in behavior.
https://www.pnas.org/content/118/12/e2017144118.abstract?etoc

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Trends in Cognitive Sciences

PAPERS

C.O. BRAND, A. MESOUDI & P.E. SMALDINO – Analogy as a Catalyst for Cumulative Cultural Evolution

Analogies, broadly defined, map novel concepts onto familiar concepts, making them essential for perception, reasoning, and communication. We argue that analogy-building served a critical role in the evolution of cumulative culture by allowing humans to learn and transmit complex behavioural sequences that would otherwise be too cognitively demanding or opaque to acquire. The emergence of a protolanguage consisting of simple labels would have provided early humans with the cognitive tools to build explicit analogies and to communicate them to others. This focus on analogy-building can shed new light on the coevolution of cognition and culture and addresses recent calls for better integration of the field of cultural evolution with cognitive science.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(21)00058-9?dgcid=raven_jbs_aip_email

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