EAORC BULLETIN 997 – 24 July 2022

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NOTICES

PUBLICATION ALERTS

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

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

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

ACADEMIA.EDU – Technological Origins: Primate Perspectives and Early Hominin Tool Use in Africa

In Oxford Research Encyclopedia, African History. Oxford University Press USA (2019).

SUSANA CARVALHO & MEGAN BEARDMORE-HERD – Technological Origins: Primate Perspectives and Early Hominin Tool Use in Africa

The origin of technology is believed to have marked a major adaptive shift in human evolution. Understanding the evolutionary process(es) underlying the first human adaptation to tool use, and the subsequent process(es) that led Homo sapiens to become the only extant primate fully dependent on technology, is one of the most stimulating topics of research of present-day archaeology. New fields of research have been founded (e.g. primate archaeology, Pliocene archaeology) during the quest to find out how old technology is, where it originated, and who were the first tool users. Historically, the vast majority of the information on this topic comes from the study of lithic (stone) tools, tools whose manufacture was generally believed to be a uniquely human characteristic until well into the 1960s. The production of lithic technology was linked first to the origin of the earliest hominins (the taxonomic group comprising modern humans, extinct human species, and all immediate human ancestors), being thought to have co-evolved with traits such as bipedalism or hunting/scavenging, and later to the evolution of the genus Homo and accompanying increases in brain size. As a result of breakthroughs in the field of primatology, and greater interdisciplinary work between archaeologists and primatologists, a paradigm shift in beliefs surrounding the uniqueness of human technology is underway.

https://www.academia.edu/38813235/Technological_Origins_Primate_Perspectives_and_Early_Hominin_Tool_Use_in_Africa_Subject_Archaeology_Online_Publication_Technological_Origins_Primate_Perspectives_and_Early_Hominin_Tool_Use_in_Africa

ACADEMIA.EDU – Neanderthals and Early Homo sapiens in the Levant

In Elena A. A. Garcea (ed.), South-Eastern Mediterranean Peoples Between 130,000 and 10,000 Years Ago. Oxbow Books (2010).

JOHN J. SHEA – Neanderthals and Early Homo sapiens in the Levant

The nature of Neanderthals' relationship to early Homo sapiens is one of the longest-running and controversial debates in palaeoanthropology. During the Middle Palaeolithic (MP) period in the East Mediterranean Levant, c. 250–45 ka BP, early representative of our species, Homo sapiens, first dispersed into western Eurasia, a region already occupied by Neanderthals (Homo neanderthalensis). Neanderthals were cold-adapted populations who evolved in western Eurasia before 200 ka BP (Hublin 1998). The oldest-known Homo sapiens fossils are found in African contexts dating to 200–150 ka BP (Trinkaus 2005). Neanderthals became extinct shortly after Homo sapiens populations expanded into Europe between 40–30 ka BP (Mellars 2006a). For much of the time that Neanderthals existed, the East Mediterranean Levant was a biogeographic corridor linking Africa to south-west Asia. The Levant is where Neanderthals and Homo sapiens are likely to have first encountered each other, and it is there that we must look for clues to these species' divergent evolutionary fates.

https://www.academia.edu/2639534/John_J_Shea_2010_Neandertals_and_Early_Homo_sapiens_in_the_Near_East_In_Elena_Garcea_Ed_South_Eastern_Mediterranean_Peoples_Between_130_000_10_000_Years_Ago_Oxford_UK_Oxbow_Books_Pp_126_143

RESEARCHGATE – Familiarity mediates apes' attentional biases toward human faces

Proceedings of the Royal Society B 289: 20212599 (2022).

JESSE G. LEINWAND et al with LYDIA M. HOPPER – Familiarity mediates apes' attentional biases toward human faces

In zoos, primates experience markedly different interactions with familiar humans, such as the zookeepers who care for them, compared with those with unfamiliar humans, such as the large volume of zoo visitors to whom they are regularly exposed. While the behaviour of zoo-housed primates in the presence of unfamiliar, and to a lesser extent familiar, humans has received considerable attention, if and how they spontaneously distinguish familiar from unfamiliar people, and the cognitive mechanisms underlying the relationships they form with familiar and unfamiliar humans, remain poorly

understood. Using a dot-probe paradigm, we assessed whether primates (chimpanzees and gorillas) show an attentional bias toward the faces of familiar humans, with whom the apes presumably had a positive relationship. Contrary to our predictions, all subjects showed a significant attentional bias toward unfamiliar people's faces compared with familiar people's faces when the faces showed a neutral expression, both with and without a surgical face mask on, but no significant attentional bias when the faces showed a surprised expression. These results demonstrate that apes can spontaneously categorize humans based on familiarity and we argue that the attentional biases the apes showed for unfamiliar human faces reflect a novelty effect.

https://www.researchgate.net/publication/360242283_Familiarity_mediates_apes%27_attentional_biases_toward_human_faces/references

HRAF SELECTED PAPERS – Explaining the Forager Population Paradox

In PNAS 116:26, 12758-12766 (2019).

MICHAEL D. GURVEN & RAZIEL J. DAVISON – Periodic catastrophes over human evolutionary history are necessary to explain the forager population paradox

Proceedings of the National Academy of Sciences of the United States of America, 2019 - 5 Hypotheses
Researchers looked at four different demographic scenarios (altered mean vital rates (i.e., fertility and mortality), vital rate stochasticity, vital rate covariance, and periodic catastrophes) and their possible effects on the rapid population growth of contemporary human foragers and steady population decline of chimpanzees. They evaluated these variables and the various conditions that would favor a more sustainable zero population growth (ZPG) among 10 small-scale subsistence human populations (Agta, Ache, Hadza, Hiwi, Ju/'hoansi, Gainj, Tsimane, Yanomamo, Northern Territory Aborigines, and Herero) and five wild chimpanzee groups (Gombe, Kanyawara, Mahale, Ngogo, and Taï). The results state that the most effective modifications towards ZPG would include a combination of more than one of the four demographic scenarios tested, with the most realistic solution including both vital rate alteration and an increase in catastrophes.

https://hraf.yale.edu/ehc/documents/1254

HRAF SELECTED PAPERS – Human grooming in comparative perspective

In American Journal of Physical Anthropology 162:4, 810-816 (2017).

ADRIAN V. JAEGGI et al – Human grooming in comparative perspective: People in six small-scale societies groom less but socialize just as much as expected for a typical primate

Grooming of conspecifics is thought to play an important social role among nonhuman primates, but the function and relative importance of such grooming among humans is unknown. Here the authors compare time spent grooming and conversing among six small-scale societies with grooming data from 69 nonhuman primate species. They test the hypothesis that conversation evolved among humans as an alternative way to obtain the social benefits (such as building and maintaining social alliances) of grooming in large groups.

https://hraf.yale.edu/ehc/documents/1104

HRAF SELECTED PAPERS – Kinship, Cooperation, and the Evolution of Moral Systems

In The Quarterly Journal of Economics 134:2, 953-1019 (2019).

BENJAMIN ENKE – Kinship, Cooperation, and the Evolution of Moral Systems

In this paper, the author argues that moral systems evolved as a way to enforce cooperation between people outside of kin groups. Because cooperation within kin groups has apparent adaptive advantages, it is argued that these moral systems will be less important for societies with tight kin groups and conversely more important for those with looser kin groups. In order to test this theory, the author creates an original model that incorporates both ethnographic data and data from contemporary countries. Thus, it is postulated that historical kinship practices will influence contemporary systems. The paper concludes that there is sufficient historical evidence for this theory.

https://hraf.yale.edu/ehc/documents/1292

NEWS

BREAKING SCIENCE – New Study Across 45 Languages Reveals Universal Language Network

In a large-scale functional magnetic resonance imaging (fMRI) study, neuroscientists from MIT and Harvard University evaluated the claim of language universality with respect to core features of its neural architecture. Approximately 7,000 languages are currently spoken and signed across the globe. language families — groups of languages that have descended from a common ancestral language, called the proto-language — which vary in size from two to over 1,500 languages.
{… and the universal property is … "the robustness [of the fronto-temporo-parietal language network across 45 languages] to cross-linguistic variation of its topography and key functional properties, including left-lateralization, strong functional integration among its brain regions and functional selectivity for language processing".
The participants? "Ninety-one participants were recruited from MIT and the surrounding Boston community. Participants were recruited on the basis of their native language (the language acquired during the first few years of life; Supplementary Table 3). All participants were proficient in English (Supplementary Table 3). Data from five participants were excluded from

http://www.sci-news.com/othersciences/linguistics/universal-language-network-11015.html

ROYAL SOCIETY – Kent was home to some of Britain's earliest humans

The archaeological site of Fordwich in Kent has played a prominent role in the history of British prehistoric research. Located in an ancient riverbed, artefacts were originally unearthed there in the 1920s by local laborers carrying out industrial quarrying. However, its importance has often not been fully appreciated due to a lack of discoveries in recent times. Research in Royal Society Open Science presents details of the first modern excavation and dating of artefacts discovered at Fordwich. These discoveries offer insight into the presence and behaviour of early humans in southern Britain, and highlight the importance of Fordwich as an archaeological site.

https://royalsocietypublishing.org/doi/10.1098/rsos.211904

SAPIENS – Women at the Hearth and on the Hunt

New archaeological findings about hunting challenge entrenched beliefs about gender roles in ancient hunter-gatherer societies.

https://www.sapiens.org/archaeology/female-hunters/

SAPIENS – What Ancient Gender Fluidity Taught Me About Modern Patriarchy

Nonbinary genders and male hierarchy as expressed in Ecuadorian clay sculptures led one archaeologist to see biases in her modern life with fresh eyes.

https://www.sapiens.org/archaeology/archaeology-biases/

SAPIENS – Did Women and Children Exist in Prehistory?

Mother Nature doesn't play fair when it comes to the preservation of archaeological remains.

https://www.sapiens.org/column/curiosities/gender-archaeology/

SCIENCE DAILY – Sentences have their own timing in the brain

Our brain links incoming speech sounds to knowledge of grammar, which is abstract in nature. But how does the brain encode abstract sentence structure? In a neuroimaging study, researchers report that the brain encodes the structure of sentences ('the vase is red') and phrases ('the red vase') into different neural firing patterns.

https://www.sciencedaily.com/releases/2022/07/220714145126.htm

SCIENCE DAILY – Brains of children with autism may not always 'see' body language

Researchers have found that children with autism spectrum disorder may not always process body movements effectively, especially if they are distracted by something else.

https://www.sciencedaily.com/releases/2022/07/220718154330.htm

SCIENCE DAILY – Cooperation among strangers has increased since the 1950s

Despite common concerns that the social fabric is fraying, cooperation among strangers has gradually increased in the U.S. since the 1950s, according to new research.

https://www.sciencedaily.com/releases/2022/07/220718094533.htm

SCIENCE DAILY – Songbird can keep time with the best of them

When it comes to keeping time, an unassuming species of songbird is on a par with professional musicians, according to new research.

https://www.sciencedaily.com/releases/2022/07/220719162122.htm

SCIENCE DAILY – Paper wasps form abstract concept of 'same' and 'different'

In a series of studies over more than 20 years, evolutionary biologists have demonstrated that paper wasps, despite their tiny brains, have an impressive capacity to learn, remember and make social distinctions about others.

https://www.sciencedaily.com/releases/2022/07/220720150534.htm

SCIENCE DAILY – Lonely old deers: Aging red deer become less social as they grow older

A new social network analysis of female wild red deer on the Isle of Rum in Scotland shows that aging deer tend to adopt a life of solitude in their advancing years.

SCIENCE DAILY – Ant colonies behave like neural networks when making decisions
Colonies decide to flee rising temperatures in much the same way that neural computations give rise to decisions.
https://www.sciencedaily.com/releases/2022/07/220722184814.htm

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SCIENCE DAILY – The 'marshmallow test': When resisting temptation, a child's cultural upbringing matters
Fifty years after the famous 'marshmallow test' found that children who resist temptation do better on measures of life success, a study of preschoolers in Boulder and Japan reveals that what kids are willing to wait for depends on their cultural upbringing.
https://www.sciencedaily.com/releases/2022/07/220721204906.htm

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SCIENCE NEWS – Listen to wild stingrays sing for the first time
Video shows creatures clicking at nearby swimmers.
https://www.science.org/content/article/listen-wild-stingrays-sing-first-time?utm_source=sfmc

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SOCIETY FOR SCIENCE – Do gophers farm roots? It's not as clear as viral articles claim
Pocket gophers aerate and fertilize the soil in a practice that encourages rudimentary food production, researchers claim. But not everyone agrees.
http://click.societyforscience-email.com/?qs=2c3476f60348af47d360c017b0e9d68400611f15b09d453f695d4ae95eb36838c7538d3271cc03c3c46450e4dd61dd29651e9dc4bca40779311283281ae5f9cc

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THE CONVERSATION – Babies can learn language sounds in the first few hours of being born
Babies who remain in silence hours after birth have different brains to those who listen to sounds.
https://theconversationuk.cmail20.com/t/r-l-tykljdc-khhlilahh-b/

PUBLICATIONS

Animal Behaviour
PAPERS

ADRIAN SOLDATI et al with JOSEP CALL & KLAUS ZUBERBÜHLER – Audience sensitivity in chimpanzee display pant hoots

Audience effects are key in studies of animal social cognition and are typically investigated during directed social interactions. Male chimpanzees, Pan troglodytes, regularly perform aggressive displays in the presence of others, often targeting a specific group member, and combine this agonistic behaviour with acoustic signals. Here, we were interested in whether the production and structure of pant hoots, a long-distance signal, were influenced by audience composition (i.e. presence and absence of specific individuals). We investigated pant hoots produced during displays by adult and subadult males of Budongo Forest, Uganda. We found that males overall called more often when their preferred social partners and females were absent from the party, as well as when more dominant males were present. We then separately analysed the four phases of pant hoots, introduction, build-up, climax and let-down, and found that audience composition and social context could often explain the presence or absence of each phase. In addition, displays were often accompanied by drumming, especially by older males and when male audiences were small. Our study adds to the growing body of literature on audience effects and other social factors and shows their impact on the structure of a sophisticated vocal sequence, which enhances the communicative capacity in a species with limited vocal control.
https://www.sciencedirect.com/science/article/pii/S0003347222001439

KAITLIN R. WELLENS et al with ANNE E. PUSEY – Female chimpanzee associations with male kin: trade-offs between inbreeding avoidance and infanticide protection

A large body of literature demonstrates the adaptive benefits of social relationships between kin, including fitness and survival. Given that most social mammals are characterized by male-biased dispersal, the majority of research on kin selection and associated advantages focuses on social relationships between female kin. Meanwhile, research on social relationships between adult male and female kin has primarily focused on inbreeding avoidance or the benefit to adult sons, with less attention on potential advantages these social relationships may provide females. The general pattern of male dominance over females in most mammal species suggests that females may benefit from protective associations with adult male kin. Using 43 years of behavioural data on the wild chimpanzees, Pan troglodytes schweinfurthii, of Gombe National Park, Tanzania, we examined association patterns between females and their adult maternal male kin. We specifically focused on how these associations may represent a trade-off between inbreeding avoidance and protection for females, particularly against infanticide. In accordance with inbreeding avoidance, we predicted that females' association with adult kin would decrease when they were maximally tumescent, signalling sexual receptivity. To determine whether female–male

kin associations provide protection to females, we examined female associations with adult male kin during their first year postpartum when infants are most vulnerable to infanticide. We predicted that during this first year postpartum, females would have a higher association with male kin than with unrelated males. We found that females associated more with adult sons and brothers than with unrelated males when they did not have a sexual swelling. Female association increased with all males across tumescence but females associated less with their brothers than they did with their sons and unrelated males when they were maximally tumescent, providing equivocal support for the inbreeding avoidance hypothesis. Furthermore, females associated more with both sons and brothers than with unrelated males in the first 6 months of the postpartum period. Higher association with brothers, relative to unrelated males, persisted throughout the first year postpartum. Together, these results speak to the cost–benefit trade-off in female and adult male kin associations, highlighting the potential protective advantage for females, especially during the postpartum period.
https://www.sciencedirect.com/science/article/abs/pii/S0003347222001531

JAY W. SCHWARTZ, MAR M. SANCHEZ & HAROLD GOUZOULES – Vocal expression of emotional arousal across two call types in young rhesus macaques

As Darwin first recognized, the study of emotional communication has the potential to improve scientific understanding of the mechanisms of signal production as well as how signals evolve. We examined the relationships between emotional arousal and selected acoustic characteristics of coo and scream vocalizations produced by female rhesus macaques, Macaca mulatta, during development. For coos, arousal was assessed through measures of stress-induced elevations of plasma cortisol exhibited in response to the human intruder test. In the analysis of screams, arousal was evaluated from the intensity of aggression experienced by the vocalizer during natural social interactions. Both call types showed a positive relationship between arousal and overall fundamental frequency (F0, perceived as pitch in humans). In coos, this association was dampened over development from infancy (6 months) to the juvenile, prepubertal period (16 months) and further to menarche (21.3–31.3 months), perhaps reflecting developmental changes in physiology, anatomy and/or call function. Heightened arousal was also associated in coos with increases in an acoustic dimension related to F0 modulation and noisiness. As monkeys matured, coos showed decreases in overall F0 as well as increased noisiness and F0 modulation, likely reflecting growth of the vocal apparatus and changes in vocal fold oscillation. Within screams, only one acoustic dimension (related to F0 modulation) showed developmental change, and only within one subclass of screams within one behavioural context. Our results regarding the acoustic correlates of arousal in both call types are broadly consistent with findings in other species, supporting the hypothesis of evolutionary continuity in emotion expression. We discuss implications for broader theories of how vocal acoustics respond to selection pressures.
https://www.sciencedirect.com/science/article/abs/pii/S0003347222001506

DANIEL N'ZOULOU KIMINOU, FRÉDÉRIC GNEPA MEHON & CLAUDIA STEPHAN – Vocal recognition of alarm calls in wild putty-nosed monkeys, Cercopithecus nictitans

Vocal recognition in social contexts is phylogenetically widespread and can be explained by kin and mate recognition or group coordination. It remains unclear why some species evolved alarm calls that also provide cues to signaller identity as the function of these calls is thought to predominantly serve predation avoidance. One hypothesis is that individually distinct alarms facilitate the detection of unreliable callers, which is in line with the idea of reputation-based mate choice. However, it remains unknown whether receivers use provided cues to identify the signaller and, if yes, how vocal signaller recognition impacts on their own behaviour during predation events. In many nonhuman primates, males provide risky antipredator services to the rest of the group while uttering conspicuous alarm calls. In putty-nosed monkeys, some male alarm types have been shown to be individually distinct and females have been shown to vocally recruit males for predation defence. Whether females are sensitive to the identity of the male supporting them in predation defence is unknown. We tested 16 groups of putty-nosed monkeys in the Nouabalé Ndoki National Park (Republic of Congo) with different alarm types from different males. Specifically, we broadcast pyow, hack and kek calls from the group's own male, a neighbouring male and an unknown male, respectively, to each group. Female receivers were sensitive to signaller identity and consistently varied their own antipredator behaviour between different males for two call types but not for eagle-related hacks. We explored different possible explanations for male recognition based on risky male antipredator services and conclude that our results are strongly in line with the reputation-based mate choice hypothesis.
https://www.sciencedirect.com/science/article/pii/S0003347222001798

COMMENTARIES

VLADIMIR V. PRAVOSUDOV – Do food-caching chickadees grow their hippocampus every autumn when they need to cache food and then shrink it for the rest of the year?

Understanding brain plasticity as it relates to environmental variation is one of the big issues in behavioural neuroscience and neuroecology. It is common, especially in popular literature to report that food-caching birds such as chickadees expand their hippocampus volume, which is involved in spatial learning and memory, by adding more neurons during the time when they are intensely caching food (autumn) and then reduce the hippocampus size and the number of hippocampal neurons during the rest of the year when they either do not cache food (summer) or cache much less (winter, spring). If true, this would be a highly adaptive mechanism allowing food-caching birds to change their memory capacity associated with seasonal variation in memories of food caches.

Current Biology

PAPERS

WILLIAM DE COTHI et al with HUGO J. SPIERS – Predictive maps in rats and humans for spatial navigation

Much of our understanding of navigation comes from the study of individual species, often with specific tasks tailored to those species. Here, we provide a novel experimental and analytic framework integrating across humans, rats, and simulated reinforcement learning (RL) agents to interrogate the dynamics of behavior during spatial navigation. We developed a novel open-field navigation task ("Tartarus maze") requiring dynamic adaptation (shortcuts and detours) to frequently changing obstructions on the path to a hidden goal. Humans and rats were remarkably similar in their trajectories. Both species showed the greatest similarity to RL agents utilizing a "successor representation," which creates a predictive map. Humans also displayed trajectory features similar to model-based RL agents, which implemented an optimal tree-search planning procedure. Our results help refine models seeking to explain mammalian navigation in dynamic environments and highlight the utility of modeling the behavior of different species to uncover the shared mechanisms that support behavior.
https://www.cell.com/current-biology/fulltext/S0960-9822(22)01095-8

eLife

PAPERS

INES BRAGA GONCALVES et al with ANDREW N RADFORD – Fitness consequences of outgroup conflict

In social species across the animal kingdom, conspecific outsiders threaten the valuable resources of groups and their members. This outgroup conflict is recognised as a powerful selection pressure, but we argue that studies explicitly quantifying the fitness consequences need to be broader in scope: more attention should be paid to delayed, cumulative, and third-party fitness consequences, not just those arising immediately to group members involved in physical contests. In the first part of this review, we begin by documenting how single contests can have survival and reproductive consequences either immediately or with a delay. Then, we step beyond contests to describe fitness consequences that can also result from interactions with cues of rival presence and the general landscape of outgroup threat, and beyond single interactions to describe cumulative effects of territorial pressure and elevated outgroup-induced stress. Using examples from a range of taxa, we discuss which individuals are affected negatively and positively, considering both interaction participants and third-party group members of the same or the next generation. In the second part of the review, we provide suggestions about how to move forward. We highlight the importance of considering how different types of outgroup conflict can generate different selection pressures and of investigating variation in fitness consequences within and between species. We finish by discussing the value of theoretical modelling and long-term studies of natural populations, experimental manipulations, and meta-analyses to develop further our understanding of this crucial aspect of sociality.
https://elifesciences.org/articles/74550

Nature Africa

ARTICLES

DANN OKOTH – Vital DNA secrets in chimp poop

Poop is helping researchers build the most extensive catalogue of genomic diversity in wild chimpanzee
https://www.nature.com/articles/d44148-022-00102-y

Nature Communications

PAPERS

AMANDA ROYKA et al – People infer communicative action through an expectation for efficient communication

Humans often communicate using body movements like winks, waves, and nods. However, it is unclear how we identify when someone's physical actions are communicative. Given people's propensity to interpret each other's behavior as aimed to produce changes in the world, we hypothesize that people expect communicative actions to efficiently reveal that they lack an external goal. Using computational models of goal inference, we predict that movements that are unlikely to be produced when acting towards the world and, in particular, repetitive ought to be seen as communicative. We find support for our account across a variety of paradigms, including graded acceptability tasks, forced-choice tasks, indirect prompts, and open-ended explanation tasks, in both market-integrated and non-market-integrated communities. Our work shows that the recognition of communicative action is grounded in an inferential process that stems from fundamental computations shared across different forms of action interpretation.
https://www.nature.com/articles/s41467-022-31716-3

Nature Human Behaviour

COURTNEY B. HILTON et mul with QUENTIN D. ATKINSON, AUDAX MABULLA & BRIAN M. WOOD – Acoustic regularities in infant-directed speech and song across cultures

When interacting with infants, humans often alter their speech and song in ways thought to support communication. Theories of human child-rearing, informed by data on vocal signalling across species, predict that such alterations should appear globally. Here, we show acoustic differences between infant-directed and adult-directed vocalizations across cultures. We collected 1,615 recordings of infant- and adult-directed speech and song produced by 410 people in 21 urban, rural and small-scale societies. Infant-directedness was reliably classified from acoustic features only, with acoustic profiles of infant-directedness differing across language and music but in consistent fashions. We then studied listener sensitivity to these acoustic features. We played the recordings to 51,065 people from 187 countries, recruited via an English-language website, who guessed whether each vocalization was infant-directed. Their intuitions were more accurate than chance, predictable in part by common sets of acoustic features and robust to the effects of linguistic relatedness between vocalizer and listener. These findings inform hypotheses of the psychological functions and evolution of human communication.
https://www.nature.com/articles/s41562-022-01410-x

Nature Neuroscience

SAIMA MALIK-MORALEDA & EVELINA FEDORENKO – The brain responds in similar ways to 45 diverse languages

The bulk of what we know about language processing in the brain comes from English, but approximately 7,000 diverse languages are spoken and signed across the globe. This Anglo-centrism severely limits language researchers in terms of phenomena they can investigate and, more importantly, it can lead to flawed generalizations and bias theorizing. For instance, the rigid word order in English has plausibly led to a strong emphasis on sequencing in language research; yet word order is flexible in many languages.

Our goal was to test whether key properties of the language system in the brain — including its location, lateralization to the left hemisphere, and specialization for language — are cross-linguistically robust. A secondary, no less important, goal was to develop a standardized and validated functional MRI (fMRI) tool for identifying language areas in speakers of as many languages as possible2, to encourage greater linguistic diversity in future research.
https://www.nature.com/articles/s41593-022-01115-4

SAIMA MALIK-MORALEDA et al – An investigation across 45 languages and 12 language families reveals a universal language network

To understand the architecture of human language, it is critical to examine diverse languages; however, most cognitive neuroscience research has focused on only a handful of primarily Indo-European languages. Here we report an investigation of the fronto-temporo-parietal language network across 45 languages and establish the robustness to cross-linguistic variation of its topography and key functional properties, including left-lateralization, strong functional integration among its brain regions and functional selectivity for language processing.
https://www.nature.com/articles/s41593-022-01114-5

Nature Scientific Data

JON ANDONI DUÑABEITIA et mul – The Multilingual Picture Database

The growing interdisciplinary research field of psycholinguistics is in constant need of new and up-to-date tools which will allow researchers to answer complex questions, but also expand on languages other than English, which dominates the field. One type of such tools are picture datasets which provide naming norms for everyday objects. However, existing databases tend to be small in terms of the number of items they include, and have also been normed in a limited number of languages, despite the recent boom in multilingualism research. In this paper we present the Multilingual Picture (Multipic) database, containing naming norms and familiarity scores for 500 coloured pictures, in thirty-two languages or language varieties from around the world. The data was validated with standard methods that have been used for existing picture datasets. This is the first dataset to provide naming norms, and translation equivalents, for such a variety of languages; as such, it will be of particular value to psycholinguists and other interested researchers. The dataset has been made freely available.
https://www.nature.com/articles/s41597-022-01552-7

Nature Scientific Reports

SANTERI YRTTIAHO et al – Neural specialization to human faces at the age of 7 months

Sensitivity to human faces has been suggested to be an early emerging capacity that promotes social interaction. However, the developmental processes that lead to cortical specialization to faces has remained unclear. The current study

investigated both cortical sensitivity and categorical specificity through event-related potentials (ERPs) previously implicated in face processing in 7-month-old infants (N290) and adults (N170). Using a category-specific repetition/adaptation paradigm, cortical specificity to human faces, or control stimuli (cat faces), was operationalized as changes in ERP amplitude between conditions where a face probe was alternated with categorically similar or dissimilar adaptors. In adults, increased N170 for human vs. cat faces and category-specific release from adaptation for face probes alternated with cat adaptors was found. In infants, a larger N290 was found for cat vs. human probes. Category-specific repetition effects were also found in infant N290 and the P1-N290 peak-to-peak response where latter indicated category-specific release from adaptation for human face probes resembling that found in adults. The results suggest cortical specificity to human faces during the first year of life. Encoding of unfamiliar cat stimuli might explain N290 amplification found in infants.
https://www.nature.com/articles/s41598-022-16691-5

P. SANTI, C. CHAIGNEAU & A. RENZULLI – Petrological footprints of the millstones of Megara Hyblaea (Sicily Island, Italy) highlight the human interactions with Mediterranean volcanoes

A petrographic and geochemical study of several volcanic millstones, representative of 119 artifacts found in the ancient Greek colony of Megara Hyblaea (Sicily Island) and recording the grinding device evolution from the Archaic to the Hellenistic period, unravelled the volcanoes involved as quarrying and production areas. This was possible also through the comparison with available petrographic and geochemical literature data of ancient volcanic millstones found in the whole Mediterranean. Saddle querns, hopper-rubber, rotary Morgantina- and Delian-type millstones of Megara Hyblaea consist of lithotypes belonging to five magmatic series: Tholeiitic, Na-Alkaline, Tholeiitic Transitional, Calcalkaline and High-K Alkaline. A provenance from the Eastern Sicily, i.e. mugearites from Etna and basalts and basaltic andesites from the Hyblaean Mountains were recognized for all the four investigated grinding devices. By contrast, a sea-trade is involved for several saddle querns made of calcalkaline basaltic andesites and andesites lavas (Aegean Islands) and two Morgantina-type millstones consisting of a calcalkaline rhyodacite ignimbrite from the quarrying site of Mulargia (Sardinia). A wide millstone trade, both local (Eastern Sicily) or maritime (Central-Eastern Mediterranean) was thus constrained through six centuries, from the foundation of the Greek colony up to the destruction of the settlement at the end of third century BCE. Finally, Vulture Volcano (southern Italian peninsula) is the most probable candidate for the only leucite- and haüyne-bearing phonolite of the High-K Alkaline Series.
https://www.nature.com/articles/s41598-022-16784-1

CARLOS NETO DE CARVALHO et al – Aurochs roamed along the SW coast of Andalusia (Spain) during Late Pleistocene

In the Iberian Peninsula the fossil record of artiodactyls spans over 53 million years. During the Pleistocene, wild cattle species such as Bison and especially Bos became common. In Late Pleistocene, the aurochs (Bos primigenius) was widespread and the only bovine living along the large river valleys of southern Iberia. Although commonly found in fossil sites and especially in cave bone assemblages, the trace fossil record of aurochs was known worldwide only from the Holocene. Large bovine and roe deer/caprine tracks were found in at least five horizons of the early Late Pleistocene (MIS 5) beach and eolian deposits of Cape Trafalgar (Cadiz Province, South of Spain). The large bovine tracks are formally described as Bovinichnus uripeda igen. et isp. nov. and compared with the record of aurochs tracks, large red deer tracks and steppe bison biogeographical distribution in Iberia. Aurochs were the most likely producers of the newly described Trafalgar Trampled Surface (TTS) and some of the large artiodactyl tracks in the Matalascañas Trampled Surface, representing the oldest aurochs track record known. This new evidence, together with comparisons with the record of possible aurochs tracks in the Mid-Late Pleistocene coastal deposits from the Asperillo cliff section in Matalascañas (Huelva Province, SW Spain) and bone assemblages known in Gibraltar, point to a recurrent use of the coastal habitat by these large artiodactyls in SW Iberia.
https://www.nature.com/articles/s41598-022-14137-6

PIETER VAN DEN BERG, SIYUAN LIU, TOM WENSELEERS & JIANLEI ZHANG – Misrepresentation of group contributions undermines conditional cooperation in a human decision making experiment

Cooperative behaviour can evolve through conditional strategies that direct cooperation towards interaction partners who have themselves been cooperative in the past. Such strategies are common in human cooperation, but they can be vulnerable to manipulation: individuals may try to exaggerate their past cooperation to elicit reciprocal contributions or improve their reputation for future gains. Little is known about the prevalence and the ramifications of misrepresentation in human cooperation, neither in general nor about its cultural facets (self-sacrifice for the group is valued differently across cultures). Here, we present a large-scale interactive decision making experiment (N = 870), performed in China and the USA, in which individuals had repeated cooperative interactions in groups. Our results show that (1) most individuals from both cultures overstate their contributions to the group if given the opportunity, (2) misrepresentation of cooperation is detrimental to cooperation in future interactions, and (3) the possibility to build up a personal reputation amplifies the effects of misrepresentation on cooperation in China, but not in the USA. Our results suggest that misrepresentation of cooperation is likely to be an important factor in (the evolution of) human social behaviour, with, depending on culture, diverging impacts on cooperation outcomes.
https://www.nature.com/articles/s41598-022-16613-5

LAUREN SCHROEDER, SARAH ELTON & REBECCA ROGERS ACKERMANN – Skull variation in Afro-Eurasian monkeys results from both adaptive and non-adaptive evolutionary processes

Afro-Eurasian monkeys originated in the Miocene and are the most species-rich modern primate family. Molecular and fossil data have provided considerable insight into their evolutionary divergence, but we know considerably less about the evolutionary processes that underlie these differences. Here, we apply tests developed from quantitative genetics theory to a large (n > 3000) cranio-mandibular morphometric dataset, investigating the relative importance of adaptation (natural selection) and neutral processes (genetic drift) in shaping diversity at different taxonomic levels, an approach applied previously to monkeys of the Americas, apes, hominins, and other vertebrate taxa. Results indicate that natural selection, particularly for differences in size, plays a significant role in diversifying Afro-Eurasian monkeys as a whole. However, drift appears to better explain skull divergence within the subfamily Colobinae, and in particular the African colobine clade, likely due to habitat fragmentation. Small and declining population sizes make it likely that drift will continue in this taxon, with potentially dire implications for genetic diversity and future resilience in the face of environmental change. For the other taxa, many of whom also have decreasing populations and are threatened, understanding adaptive pressures similarly helps identify relative vulnerability and may assist with prioritising scarce conservation resources.
https://www.nature.com/articles/s41598-022-16734-x

New Scientist
NEWS

Robot that can perceive its body has self-awareness, claim researchers

The team claims to have given a robot self-awareness of its location in physical space, but others are sceptical.
https://www.newscientist.com/article/2328245-robot-that-can-perceive-its-body-has-self-awareness-claim-researchers/

Ancient DNA adds to evidence for Native Americans' east Asian ancestry

Genetic analysis of a woman's skull from 14,000 years ago found in south-west China suggests she was related to an ancient population that migrated to North America from east Asia.
https://www.newscientist.com/article/2328757-ancient-dna-adds-to-evidence-for-native-americans-east-asian-ancestry/

Penguins adapt their accents to sound more like their friends

African penguins modify their calls to sound more similar to their partners and colony mates over time, showing a form of vocal learning known in only a few animals.
https://www.newscientist.com/article/2328323-penguins-adapt-their-accents-to-sound-more-like-their-friends/

ARTICLES

ANNALEE NEWITZ – Mistakenly calling AIs "sentient" is more dangerous than we think

A Google engineer recently claimed an AI was alive and that it had hired a lawyer. If judges were to accept these claims, it could lead to AIs being frozen in their biased states.
https://www.newscientist.com/article/mg25533962-000-mistakenly-calling-ais-sentient-is-more-dangerous-than-we-think/

PLoS Biology
PAPERS

JOAN ORPELLA et al with DAVID POEPPEL – Differential activation of a frontoparietal network explains population-level differences in statistical learning from speech

People of all ages display the ability to detect and learn from patterns in seemingly random stimuli. Referred to as statistical learning (SL), this process is particularly critical when learning a spoken language, helping in the identification of discrete words within a spoken phrase. Here, by considering individual differences in speech auditory–motor synchronization, we demonstrate that recruitment of a specific neural network supports behavioral differences in SL from speech. While independent component analysis (ICA) of fMRI data revealed that a network of auditory and superior pre/motor regions is universally activated in the process of learning, a frontoparietal network is additionally and selectively engaged by only some individuals (high auditory–motor synchronizers). Importantly, activation of this frontoparietal network is related to a boost in learning performance, and interference with this network via articulatory suppression (AS; i.e., producing irrelevant speech during learning) normalizes performance across the entire sample. Our work provides novel insights on SL from speech and reconciles previous contrasting findings. These findings also highlight a more general need to factor in fundamental individual differences for a precise characterization of cognitive phenomena.
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001712

PAPERS

REBECCA HOOPER, BECKY BRETT & ALEX THORNTON – Problems with using comparative analyses of avian brain size to test hypotheses of cognitive evolution

There are multiple hypotheses for the evolution of cognition. The most prominent hypotheses are the Social Intelligence Hypothesis (SIH) and the Ecological Intelligence Hypothesis (EIH), which are often pitted against one another. These hypotheses tend to be tested using broad-scale comparative studies of brain size, where brain size is used as a proxy of cognitive ability, and various social and/or ecological variables are included as predictors. Here, we test how robust conclusions drawn from such analyses may be. First, we investigate variation in brain and body size measurements across >1000 bird species. We demonstrate that there is substantial variation in brain and body size estimates across datasets, indicating that conclusions drawn from comparative brain size models are likely to differ depending on the source of the data. Following this, we subset our data to the Corvides infraorder and interrogate how modelling decisions impact results. We show that model results change substantially depending on variable inclusion, source and classification. Indeed, we could have drawn multiple contradictory conclusions about the principal drivers of brain size evolution. These results reflect concerns from a growing number of researchers that conclusions drawn from comparative brain size studies may not be robust. We suggest that to interrogate hypotheses of cognitive evolution, a fruitful way forward is to focus on testing cognitive performance within and between closely related taxa, with an emphasis on understanding the relationship between informational uncertainty and cognitive evolution.

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0270771

JESSICA VON DER MEDEN et al – Tufas indicate prolonged periods of water availability linked to human occupation in the southern Kalahari

Detailed, well-dated palaeoclimate and archaeological records are critical for understanding the impact of environmental change on human evolution. Ga-Mohana Hill, in the southern Kalahari, South Africa, preserves a Pleistocene archaeological sequence. Relict tufas at the site are evidence of past flowing streams, waterfalls, and shallow pools. Here, we use laser ablation screening to target material suitable for uranium-thorium dating. We obtained 33 ages covering the last 110 thousand years (ka) and identify five tufa formation episodes at 114–100 ka, 73–48 ka, 44–32 ka, 15–6 ka, and ~3 ka. Three tufa episodes are coincident with the archaeological units at Ga-Mohana Hill dating to ~105 ka, ~31 ka, and ~15 ka. Based on our data and the coincidence of dated layers from other local records, we argue that in the southern Kalahari, from ~240 ka to ~71 ka wet phases and human occupation are coupled, but by ~20 ka during the Last Glacial Maximum (LGM), they are decoupled.

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0270104

RINAD BAKHTI et al – Testing the impact of interpersonal regulatory fit on empathy, helping intentions, and prosocial behaviour

Similarity with others in need regarding various attributes [e.g., social group membership] has been shown to increase individuals' empathic responses, willingness to help and prosocial behaviour. We tested whether a subtle similarity, namely of observers' and targets' self-regulatory orientation in terms of a promotion or prevention regulatory focus [i.e., interpersonal regulatory fit], would entail similar effects. Interpersonal regulatory [mis]fit was conveyed through focus-congruent or -incongruent emotional reactions which targets, facing distressing situations, expressed. We predicted that when observer participants' regulatory focus fits with targets' negative emotional reaction [i.e., promotion focus—dejection or prevention focus—agitation], they would be more likely to express empathy, willingness to help, and to engage in prosocial behaviour towards this target compared to conditions of misfit. Five studies relied on observers' chronic regulatory focus [Study 1, 3, & 4] and situationally induced regulatory focus [Study 2 & 5] and presented different distressing scenarios with targets conveying focus [in]congruent negative emotions. Inconsistent results emerged across the studies, which indicated misfit, fit and no effects. Study characteristics did not suggest a moderator explaining these inconsistent findings. An internal meta-analysis across all studies indicated that overall there was no evidence of either a fit or a misfit effect. This work sheds light on the technical challenges of exploring relations between subtle interpersonal regulatory [mis]fit and prosocial reactions. Implications for future research are discussed, including the importance of creating stronger interpersonal [mis]fit experiences by means of incorporating descriptions of distressed targets' hindered goal pursuits as well as negative reactions.

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0270462

COMMENTARIES

JORDAN KODNER, SPENCER CAPLAN & CHARLES YANG – Another model not for the learning of language

It is laudable for Yang and Piantadosi (ref. 1, henceforth YP) to tackle the important question of how language is generated and learned. Their reported success in learning a range of grammars from small amounts of data are striking, especially since some of these grammars belong to classes which are provably unlearnable under such conditions. However, their project is severely undermined by their evaluation method and by their conception of language.

STEVEN T. PIANTADOSI & YUAN YANG – Reply to Kodner et al.: Fundamental misunderstanding of both model and methods

Our recent work shows a program-learning model can acquire some key structures in natural language, including recursive hierarchies and patterns that require more than context-free capacities.

Kodner et al.'s (KCY) commentary is based on several fundamental misunderstandings. Most notably, they claim that our "model transforms candidate hypotheses into probabilistic context-free grammars that are evaluated against the training data via Bayesian inference." This is unambiguously incorrect: At no point does our model convert hypotheses into probabilistic context-free grammars.

https://www.pnas.org/doi/full/10.1073/pnas.2204944119

Prospect

ARTICLES

SAMEER RAHIM – Frans de Waal: "Female monkeys pick up the dolls and males pick up the trucks"

The primatologist on what apes can teach us about sex and gender.

https://www.prospectmagazine.co.uk/people/frans-de-waal-female-monkeys-pick-up-the-dolls-and-males-pick-up-the-trucks

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Royal Society Open Science

ARTICLES

ALASTAIR KEY et al – On the earliest Acheulean in Britain: first dates and in-situ artefacts from the MIS 15 site of Fordwich (Kent, UK)

Northern Europe experienced cycles of hominin habitation and absence during the Middle Pleistocene. Fluvial gravel terrace sites in the east of Britain and north of France provide a majority of the data contributing to this understanding, mostly through the presence or absence of stone-tool artefacts. To date, however, relatively few sites have been radiometrically dated, and many have not been excavated in modern times, leading to an over-reliance on selectively sampled and poorly dated lithic assemblages. This includes Fordwich (Kent, UK), where over 330 bifaces were discovered through industrial quarrying in the 1920s. Here, we present the first excavation and dating of artefacts discovered in situ at Fordwich, alongside their technological analysis and relationship to those previously recovered. The site is demonstrated to retain deposits of Lower Palaeolithic artefacts, with 251 flakes, scrapers and cores identified to date. Infrared-radiofluorescence (IR-RF) dating of feldspar reveals 112 artefacts to have come from levels dating to at least 570 ± 36 to 513 ± 30 thousand years ago (ka) and are most plausibly assigned to an MIS 14 deposition, with artefacts produced during MIS 15 (approx. 560–620 ka). Indeed, these IR-RF samples provide minimum ages for artefacts. Combined with evidence from exposures linked to the original quarrying activities, a similar MIS 15 age is suggested for the more than 330 handaxe artefacts discovered in the 1920s. The remaining excavated artefacts come from levels dated to between 347 ± 22 and 385 ± 21 ka (MIS 10 or 11), with this later age interpreted to reflect post-MIS 14 deposition by substrate gullying and solifluction. These data demonstrate Fordwich to be one of the earliest Palaeolithic sites in northwestern Europe, and to retain the only large Acheulean handaxe assemblage directly dated to pre-MIS 13. Thus, Fordwich is determined to be a crucial piece of the pre-Anglian Palaeolithic puzzle in northern Europe.

https://royalsocietypublishing.org/doi/10.1098/rsos.211904

Science Advances

PAPERS

PABLO MACEIRA-ELVIRA et al – Dissecting motor skill acquisition: Spatial coordinates take precedence

Practicing a previously unknown motor sequence often leads to the consolidation of motor chunks, which enable its accurate execution at increasing speeds. Recent imaging studies suggest the function of these structures to be more related to the encoding, storage, and retrieval of sequences rather than their sole execution. We found that optimal motor skill acquisition prioritizes the storage of the spatial features of the sequence in memory over its rapid execution early in training, as proposed by Hikosaka in 1999. This process, seemingly diminished in older adults, was partially restored by anodal transcranial direct current stimulation over the motor cortex, as shown by a sharp improvement in accuracy and an earlier yet gradual emergence of motor chunks. These results suggest that the emergence of motor chunks is preceded by the storage of the sequence in memory but is not its direct consequence; rather, these structures depend on, and result from, motor practice.

https://www.science.org/doi/full/10.1126/sciadv.abo3505

Trends in Cognitive Sciences

M. GABRIELA NAVAS-ZULOAGA, THEODORE P. PAVLIC & BRIAN H. SMITH – Alternative model systems for cognitive variation: eusocial-insect colonies

Understanding the origins and maintenance of cognitive variation in animal populations is central to the study of the evolution of cognition. However, the brain is itself a complex, hierarchical network of heterogeneous components, from diverse cell types to diverse neuropils, each of which may be of limited use to study in isolation or prohibitively challenging to manipulate in situ. Consequently, highly tractable alternative model systems may be valuable tools. Eusocial-insect colonies display emergent cognitive-like properties from relatively simple social interactions between diverse subunits that can be observed and manipulated while operating collectively. Here, we review the individual-scale mechanisms that cause group-level variation in how colonies solve problems analogous to cognitive challenges faced by brains, like decision-making, attention, and search.

https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00142-5